a

Mass of the _____ must always equal the mass of the _____.

Balance the following:

$H_2 + O_2 \longrightarrow H_2O$

$Na + Cl_2 \longrightarrow NaCl$

$Br_2 + KI \longrightarrow I_2 + KBr$

$N_2 + H_2 \longrightarrow NH_3$

b

Complete the following sentences

The relative formula mass is the (_____) of a compound.

It is the sum of the _____ atomic masses (A_r) of the atoms.

Calculate the relative formula mass for the following. Show your working out.

A_r of C = 12
A_r of H = 1
A_r of O = 16
A_r of N = 14

Example:
CO_2
12 + (16 × 2)
12 + 32
= 44

H_2O

CH_4

NH_4NO_3

c

When a gas is produced during a reaction, why might the mass go down?

_____

_____

_____

Write the equation for when magnesium reacts with oxygen.

_____

What happens to the mass of the product from the question above?

_____

_____

_____

d

$$\% \text{ mass} = \frac{A_r \times \text{number of atoms} \times 100}{M_r \text{ of the compound}}$$

Using the equation above, calculate the % mass of sodium (Na) in NaCl.

A_r of Na = 23

A_r of Cl = 35.5

e

Use the A_r values below to calculate the molar mass of these elements. Don't forget the units.

E.g. A_r of sodium = 23, one mole = 23g

A_r of K = 39

A_r of F = 19

A_r of O = 16

A_r of Mg = 24

potassium

fluorine (Fl_2)

oxygen (O_2)

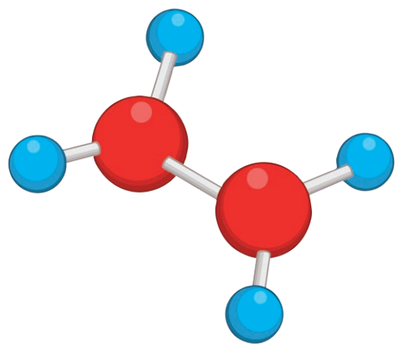
magnesium

f

What is the equation to calculate the number of moles for a pure substance.

moles = _____

Rearrange the equation to calculate the mass.



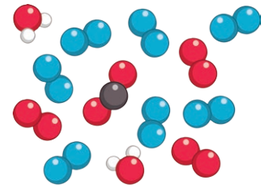
g

What unit are chemical amounts measured in?

1. cm
2. m/s
3. moles

Avogadro's constant is...

1. 6.03×10^{23} per mole
2. 6.02×10^{23} per mole
3. 6.05×10^{23} per mole

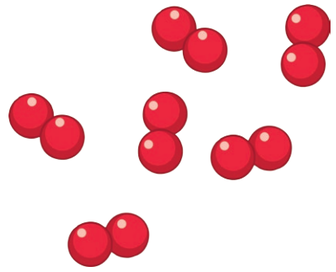


h

What mass of nitrogen is in 92g of NO_2?

A_r of N = 14

A_r of O = 16



i

Using the equation

$Na_2CO_3 + 2HCl \longrightarrow 2NaCl + H_2O + CO_2$

What mass of NaCl would be produced from 2.5 grams of sodium carbonate?

A_r of Na = 23

A_r of H = 1

A_r of Cl = 35.5

A_r of O = 16

A_r of C = 12

j

What is the mass of solute when the concentration of a solution is 4mol/dm³ and the volume is 600cm³?

k

$$\text{concentration (gm/dm}^3\text{)} = \frac{\text{mass of solute}}{\text{volume}}$$

Using the equation above, calculate the following:

The mass of a solute is 60g and the volume is 0.5dm³, what is the concentration?

l

Rearrange the following equation to find volume.

$$\text{concentration (mol/dm}^3\text{)} = \frac{\text{mass of solute}}{\text{volume}}$$

m

Why, in some reactions, are the reactants in excess?

n

Define concentration.

Draw a diagram to show a solution with a low concentration and a solution with a high concentration

o

Convert the following measurements in cm³ to dm³.

1. 15cm³
2. 60cm³
3. 90cm³
4. 0.5cm³

I understand the following topic:

I need to work on the following topic:

a

Mass of the **product** must always equal the mass of the **reactants**.

Balance the following:

$2H_2 + O_2 \longrightarrow 2H_2O$
$2Na + Cl_2 \longrightarrow 2NaCl$
$Br_2 + 2KI \longrightarrow I_2 + 2KBr$
$N_2 + 3H_2 \longrightarrow 2NH_3$

b

Complete the following sentences

The relative formula mass is the (M_r) of a compound.

It is the sum of the **relative** atomic masses (A_r) of the atoms.

Calculate the relative formula mass for the following. Show your working out.

A_r of C = 12
A_r of H = 1
A_r of O = 16
A_r of N = 14

Example:
CO_2
12 + (16 × 2)
12 + 32
= 44

H_2O
(1 × 2) + 16
2 + 16
= 18

CH_4
12 + (1 × 4)
12 + 4
= 16

NH_4NO_3
14 + (1 × 4) + 14 + (16 × 3)
14 + 4 + 14 + 48
= 80

c

When a gas is produced during a reaction, why might the mass go down?

The gas may be released into the environment.

Write the equation for when magnesium reacts with oxygen.

$2Mg + O_2 \longrightarrow 2MgO$

What happens to the mass of the product from the question above?

The mass increases because oxygen is added from the environment.

d

$$\% \text{ mass} = \frac{A_r \times \text{number of atoms} \times 100}{M_r \text{ of the compound}}$$

Using the equation above, calculate the % mass of sodium (Na) in NaCl.

A_r of Na = 23

A_r of Cl = 35.5

$$\textbf{\% mass} = \frac{\mathbf{23 \times 1 \times 100}}{\mathbf{23 + 35.5}}$$

$$= \frac{2300}{58.5}$$

= 39.3% (to 1d.p.)

e

Use the A_r values below to calculate the molar mass of these elements. Don't forget the units.

E.g. A_r of sodium = 23, one mole = 23g

A_r of K = 39

A_r of F = 19

A_r of O = 16

A_r of Mg = 24

potassium (39 × 1) 39g/mol

fluorine (19 × 2) 38g/mol

oxygen (16 × 2) 32g/mol

magnesium (24 × 1) 24g/mol

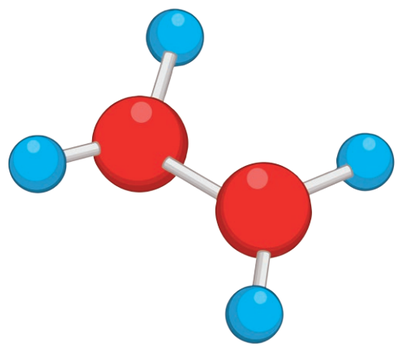
f

What is the equation to calculate the number of moles for a pure substance.

$$\text{moles} = \frac{\textbf{mass in g}}{\mathbf{M_r}}$$

Rearrange the equation to calculate the mass.

mass = moles × M_r



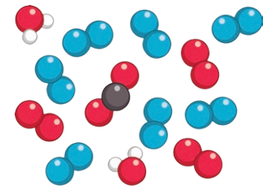
g

What unit are chemical amounts measured in?

1. cm
2. m/s
3. **moles**

Avogadro's constant is...

1. 6.03×10^{23} per mole
2. **6.02×10^{23} per mole**
3. 6.05×10^{23} per mole



h

What mass of nitrogen is in 92g of NO_2?

A_r of N = 14

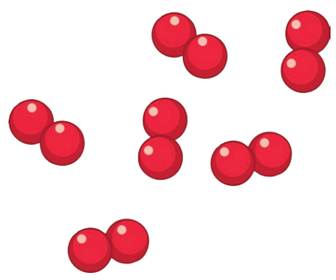
A_r of O = 16

M_r = 14 + (16 × 2) = 46

N = 14

$$\frac{14}{46} = 0.304$$

0.304 × 92 = 28g



i

Using the equation

$Na_2CO_3 + 2HCl \longrightarrow 2NaCl + H_2O + CO_2$

What mass of NaCl would be produced from 2.5 grams of sodium carbonate?

A_r of Na = 23

A_r of H = 1

A_r of Cl = 35.5

A_r of O = 16

A_r of C = 12

M_r of NaCl = 58.5
M_r of Na_2CO_3 = 106

$\frac{2.5}{106}$ = 0.0236 moles (to 3 significant figures)

0.0236 × 2 = 0.0472 (1:2 ratio)

0.0472 × 58.5 = 2.76 grams of NaCl

j

What is the mass of solute when the concentration of a solution is 4mol/dm^3 and the volume is 600cm^3?

Convert 600cm^3 to dm^3 = 0.6dm^3

mass = concentration × volume

4 × 0.6dm^3 = 2.4g

k

concentration (gm/dm^3) = $\frac{\text{mass of solute}}{\text{volume}}$

Using the equation above, calculate the following:

The mass of a solute is 60g and the volume is 0.5dm^3, what is the concentration?

Concentration = $\frac{60}{0.5}$

= 120g/dm^3

l

Rearrange the following equation to find volume.

concentration (mol/dm^3) = $\frac{\text{mass of solute}}{\text{volume}}$

volume = $\frac{\text{mass of solute}}{\text{concentration}}$

m

Why, in some reactions, are the reactants in excess?

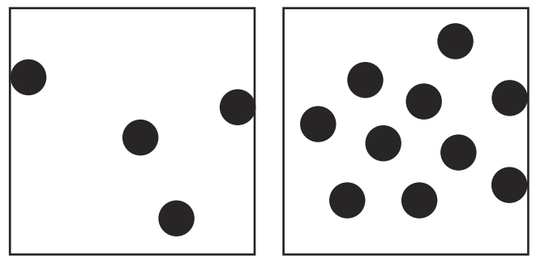
To make sure that the reaction has completely finished and the other reactant has been completely used up.

n

Define concentration.

The amount of a substance in a certain volume of a solution is called its concentration.

Draw a diagram to show a solution with a low concentration and a solution with a high concentration



o

Convert the following measurements in cm^3 to dm^3.

1. 15cm^3
2. 60cm^3
3. 90cm^3
4. 0.5cm^3

Divide by 1000

1. **0.015dm^3**
2. **0.06dm^3**
3. **0.09dm^3**
4. **0.0005dm^3**

I understand the following topic:

I need to work on the following topic: