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Mole

Definition: The mole is the amount of substance that contains the same number of elementary units (atoms, molecules, or particles) as the numbers of atoms in exactly 12g of carbon-12

Avogadro's Number

Avogadro's Number defines the amount of particles in one mole. One mole contains 6,02 * 10^{23} particles. One mole of a substance has a mass equal to it's relative formula mass in grams.

$$1 \text{ mole of anything} = 6,02 \times 10^{23}$$

💡 Example

1 mole of carbon atoms = 12g of carbon = 6,02 x 10^{23} carbon atoms

1 mole of water = 18g of water = 6,02 x 10^{23} water molecules

1 mole of potassium bromide = 119 KBr = 6,02 x 10^{23} units

Formulae to work out n (moles)

if given mass and molar mass (or relative atomic mass):

$$n = \frac{m}{M}$$

$$n = \text{number of moles}$$
$$m = \text{mass (grams) of substance}$$
$$M = \text{molar mass} g.mol^{-}1(\text{use relative atomic mass})$$

if given number of particles

$$n = \frac{N_O}{N_A}$$

$n =$ number of moles
$N_O =$ number of particles
$N_A =$ Avogadro's number $= 6,02 \times 10^{23}$

if given the volume at Standard Temperature and pressure (STP)

$$n = \frac{V}{V_m}$$

Where:

$n =$	number of moles (mol)
$V =$	volume (dm^{-3})
$V_m =$	Molar Gas Volume $= 22,4 dm^3$

> Standard Temperature and pressure (STP), Molar Gas Volume

If given Concentration

$$n = c \times V$$

$n =$ number of moles (mol)
$V =$ volume (dm^{-3})
$c =$ Concentration $(mol.dom^{-3})$