Mole

See text p. 48

Definition- An Avogadro's number of particles.

6.02×10^{23}

A mol of particles has an equivalent mass in grams (instead of a.m.u.)

e.g.

Molecule	Mole of Molec.
NaCl 58.44 u	mole of NaCl 58.44 g

e.g. Molar mass of Na_2CO_3

2-Na	$2 \times 22.99 = 45.98$
1-C	$1 \times 12.01 = 12.01$
3-O	$3 \times 16.00 = 48.00$
	105.99 g

Questions - p. 57 #16-19

Choose

Mole-Mass Calculations

Example- 1 mol H_2O

$2 \times 1.01 = 2.02$
$1 \times 16.00 = 16.00$
$18.02\ g/mol$

How many moles H_2O in $36.04\ g\ H_2O$

$$36.04\ g\ H_2O \times \frac{1\ mol\ H_2O}{18.02\ g\ H_2O} = 2.00\ mol\ H_2O$$

2. How many moles Na_2CO_3 in $5.0\ g\ Na_2CO_3$

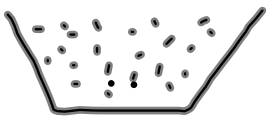
$$5.0\ g\ Na_2CO_3 \times \frac{1\ mol\ Na_2CO_3}{105.99\ g\ Na_2CO_3} \quad 0.047\ mol\ Na_2CO_3$$

3. What is the mass of $4.6\ mol\ Na_2CO_3$?

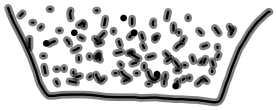
$$4.6\ mol\ Na_2CO_3 \times \frac{105.99\ g\ Na_2CO_3}{1\ mol\ Na_2CO_3} = 487.55\ Na_2CO_3$$

Questions - p. 59 #20-25 Choose

Concentration-moles/Litre



A



B ↑ more concentrated

Units- $\frac{\text{mol}}{\text{L}}$ ← solute

↖ volume

Jan 20-5:48 PM

Stoichiometry-Molecule

Analogy - recipe (double or half)

Example - $\_CH_4 + \underline{2}O_2 \rightarrow \_CO_2 + \underline{2}H_2O$

1 molecule CH_4 combines ≅ 2 molec. of O_2

1 molec. CH_4 produces 2 molec. H_2O

Molec. Ratio 1 : 2 : 1 : 2

Example - How many molecules of CH_4 combine ≅ 20 molecules of O_2?

$$20 \text{ molec. } O_2 \times \frac{1 \text{ molec. } CH_4}{2 \text{ molec. } O_2} = 10 \text{ molec } CH_4$$

from balanced equation

p. 114 #1 (a-c)

Read ch. 4 p. 110-117

Stoichiometry- Mole

Recall – Molecule stoichiometry

$CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$

Molecule	1	: 2 :	1	: 2
Dozens	1	: 2 :	1	: 2
Moles	1	: 2 :	1	: 2

Example- How many moles CH_4 react with 0.53 moles O_2?

$$0.53 \text{ mol } O_2 \times \frac{1 \text{ mol } CH_4}{2 \text{ mol } O_2} = 0.265 \text{ mol } CH_4$$

p. 115 #4-6 (choose)