Promoting scholarship of Science by maintaining curiosity, developing scientific skills and encouraging the application of knowledge to solve problems and communicate ideas.

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Chemistry Cram 1.4

Paper-1

1. **Atomic Structure**
2. **Groups of the Periodic Table**
3. **Structure and Bonding**
4. **Quantitative Chemistry**
5. **Chemical Reactions**
6. **Energy**

Formula masses

- Use your periodic table to find individual masses and then add them all together. Capital letters denote different elements

NaOH 1Na + 1O + 1H = 23 + 16 + 1 = 40

Al_2O_3

$Ca(OH)_2$

$2Ca(OH)_2$

Small subscript numbers only apply to the element immediately before it

O_2 = O + O

CO_2 = C + O + O

If brackets are before it then everything in the brackets is multiplied by the number

For $Mg(OH)_2$ there are 2 O and 2 H but only 1 Mg

A BIG number in front multiplies everything that follows it

Formula masses

- Use your periodic table to find individual masses and then add them all together. Capital letters denote different elements

$NaOH$ — 1Na + 1O + 1H = 23 + 16 + 1 = 40

Al_2O_3 — 2Al + 3O = 27 + 27 + 16 + 16 + 16 = 102

$Ca(OH)_2$ — 1Ca + 2O + 2H = 40 + 16 + 16 + 1 + 1 = 74

$2Ca(OH)_2$ — 2 X 74 = 148

Small subscript numbers only apply to the element immediately before it

O_2 = O + O

CO_2 = C + O + O

If brackets are before it then everything in the brackets is multiplied by the number

For $Mg(OH)_2$ there are 2 O and 2 H but only 1 Mg

A BIG number in front multiplies everything that follows it

Reacting Masses

Relative formula mass=

$$2Na + 2H_2O \longrightarrow 2NaOH + H_2$$

46 g + g = g + g

Use the periodic table to find masses of each element (top number) and add them together.

Then use simple ratios to find values. If you double 1 mass all the other masses double etc.

46 g of sodium makes 80g of sodium hydroxide

So 23 g of sodium will make _____g NaOH

4.6 g of sodium will make _____g NaOH

So 0.23 g of sodium will make _____g NaOH

Reacting Masses

Relative formula mass=

$$2Na + 2H_2O \longrightarrow 2NaOH + H_2$$

46 g + 36 g = 80 g + 2 g

Use the periodic table to find masses of each element (top number) and add them together.

Then use simple ratios to find values. If you double 1 mass all the other masses double etc.

46 g of sodium makes 80g of sodium hydroxide

So 23 g of sodium will make 40 g NaOH

4.6 g of sodium will make 8.0 g NaOH

So 0.23 g of sodium will make 0.4 g NaOH

HIGHER - Moles and Avogadro's number

A mole of a substance is the relative formula mass of that substance in grams

number of moles of a compound = $\frac{\text{Mass (in g)}}{\text{Relative mass (mass number)}}$

e.g. 1 mole of Na is 23g but 1 mole of C is 12g (from mass numbers)

If we have 6g of Carbon we will have 0.5 moles of it

If we have 24g of C we will have 2 moles of it

Avogadro's Constant:

1 mole = 6.02×10^{23} molecules

1 mole of anything conatins the same number of molecules

23g Na = 6.02×10^{23}

12g C = 6.02×10^{23}

6g C = 3.01×10^{23}

24g C = 12.04×10^{23}

Using moles lets us use the correct amount of particles or molecules to react with each other. Because all elements have different masses, if we used equal masses we would have different numbers of particles.