Percent Composition Calculations

- a percent composition is the percentage by mass of every element present in a compound

Based on Experimental Results:

- use this style for percent composition of magnesium lab write-up

- all calculations should be three lines, equal signs should be aligned

Sample Observations:

mass crucible	22.294 g
mass crucible + Mg	22.569 g
mass crucible + ash (MgO product)	22.750 g

Determine mass of Mg:

mass Mg = (mass crucible + Mg) - (mass crucible)

mass Mg = 22.569 g - 22.294 g

mass Mg = 0.275 g

Determine mass of MgO:

mass MgO = (mass crucible + MgO) - (mass crucible)

mass MgO = 22.750 g - 22.294 g

mass MgO = 0.456 g

Determine mass of O_2:

mass O = (mass MgO) - (mass Mg)

mass O = 0.456 g - 0.275 g

mass O = 0.181 g

Determine percentage magnesium:

$$\% \text{ Mg} = \frac{\text{mass Mg}}{\text{mass MgO}} \times 100 \%$$

$$\% \text{ Mg} = \frac{0.275 \text{ g}}{0.456 \text{ g}} \times 100 \%$$

% Mg = 60.31 %

Determine percentage oxygen:

$$\% \text{ O} = \frac{\text{mass O}}{\text{mass MgO}} \times 100 \%$$

$$\% \text{ O} = \frac{0.181 \text{ g}}{0.456 \text{ g}} \times 100 \%$$

$$\% \text{ O} = 39.69 \%$$

Based on Chemical Formula:

eg: $C_6H_{12}O_6$ (formula for glucose)

formula mass calculation (molecular mass calculation, molar mass):

   C: 6 x 12.01 g = 72.06 g

   H: 12 x 1.01 g = 12.12 g

   O: 6 x 16.00 g = 96.00 g

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     $C_6H_{12}O_6$ 180.18 g

$$\% \text{ C} = \frac{\text{mass C}}{\text{mass C}_6\text{H}_{12}\text{O}_6} \times 100 \%$$

$$\% \text{ C} = \frac{72.06 \text{ g}}{180.18 \text{ g}} \times 100 \%$$

$$\% \text{ C} = 39.99 \%$$

$$\% \text{ H} = \frac{\text{mass H}}{\text{mass C}_6\text{H}_{12}\text{O}_6} \times 100 \%$$

$$\% \text{ H} = \frac{12.12 \text{ g}}{180.18 \text{ g}} \times 100 \%$$

$$\% \text{ H} = 6.72 \%$$

$$\% \text{ O} = \frac{\text{mass O}}{\text{mass C}_6\text{H}_{12}\text{O}_6} \times 100 \%$$

$$\% \text{ O} = \frac{96.00 \text{ g}}{180.18 \text{ g}} \times 100 \%$$

$$\% \text{ O} = 53.28 \%$$