

Percent Composition

What is percent composition? the percent by mass of
the elements in a compound
(atoms or ions) (molecules or form. units)

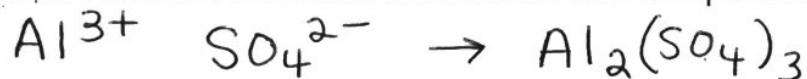
Percent composition is also referred to as mass %
or % by mass

How do you calculate percent composition?

$$\frac{\text{g part}}{\text{g whole}} \times 100$$

Example 1: Find the percent composition of aluminum sulfate.

1. Write the correct chemical formula for the compound.



2. Calculate molar mass of the compound.

$$2 \text{Al} \times 26.98 = 53.96$$

$$3 \text{S} \times 32.07 = 96.21$$

$$12 \text{O} \times 16.00 = 192.00$$

3. Percent of Al = 342.17 g

$$\frac{53.96 \text{ g Al}}{342.17 \text{ g Al}_2(\text{SO}_4)_3} \times 100 = 15.77\% \text{ Al}$$

$$\text{Percent of S} = \frac{96.21 \text{ g S}}{342.17 \text{ g Al}_2(\text{SO}_4)_3} \times 100 = 28.12\% \text{ S}$$

$$\text{Percent of O} = \frac{192.00 \text{ g O}}{342.17 \text{ g Al}_2(\text{SO}_4)_3} \times 100 = 56.112\% \text{ O}$$

4. Check that the sum of the percentages is 100%

Example 2: For the above compound, calculate the mass of Al in a 35.00 gram sample of aluminum sulfate.

$$35.00 \text{ g} \times 0.1577 = 5.520 \text{ g Al}$$

Percent Composition

1.) H_2SO_4 Molar Mass?

$$2H \times 1.01 = 2.02$$

$$1S \times 32.06 = 32.06$$

$$4O \times 16.00 = 64.00$$

$$\underline{98.08g} \rightarrow MM$$

$$\%H \quad \frac{2.02}{98.08} \times 100 = 2.06\%H$$

$$\%S \quad \frac{32.06}{98.08} \times 100 = 32.69\%S$$

$$\%O \quad \frac{64.00}{98.08} \times 100 = 65.25\%O$$

$$\underline{\quad\quad\quad} \\ 100\%$$

acetate



$$\begin{aligned} 1 \text{ Li} \times 6.94 &= 6.94 \\ 2 \text{ C} \times 12.01 &= 24.02 \\ 3 \text{ H} \times 1.01 &= 3.03 \\ 2 \text{ O} \times 16.00 &= 32.00 \end{aligned}$$

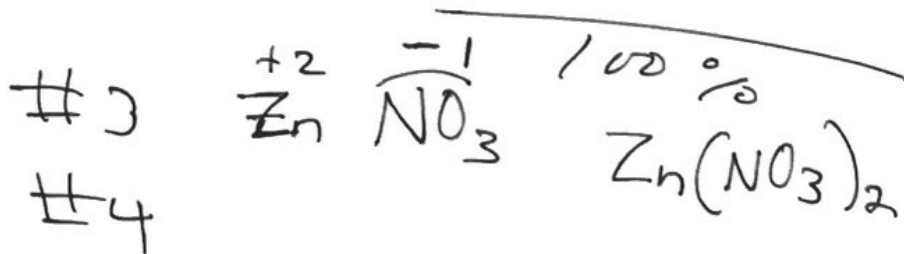
$\frac{65.99 \text{ g}}{1 \text{ mole}}$ MM

$$\% \text{ Li} \quad \frac{6.94}{65.99} \times 100 = 10.52 \% \text{ Li}$$

$$\% \text{ C} \quad \frac{24.02}{65.99} \times 100 = 36.40 \% \text{ C}$$

$$\% \text{ H} \quad \frac{3.03}{65.99} \times 100 = 4.59 \% \text{ H}$$

$$\% \text{ O} \quad \frac{32.00}{65.99} \times 100 = 48.49 \% \text{ O}$$



Percent Composition

#3 Zinc nitrate $\text{Zn}(\text{NO}_3)_2$

$$1 \text{ Zn} \times 65.39 = 65.39 \text{ g}$$

$$2 \text{ N} \times 14.01 = 28.02 \text{ g}$$

$$6 \text{ O} \times 16.00 = 96.00 \text{ g}$$

$$189.41 \text{ g}$$

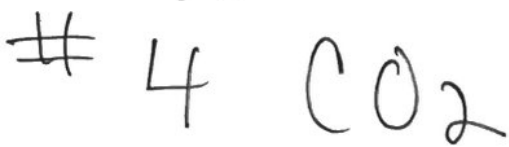
$$\% \text{ Zn} = \frac{65.39}{189.41} \times 100 = 34.52\% \text{ Zn}$$

$$\% \text{ N} = \frac{28.02}{189.41} \times 100 = 14.79\% \text{ N}$$

$$\% \text{ O} = \frac{96.00}{189.41} \times 100 = 50.68\% \text{ O}$$

99.99

Percent Composition



$$1\text{C} \times 12.01 = 12.01$$

$$2\text{O} \times 16.00 = 32.00$$

$$\text{MM} \rightarrow 44.01 \text{ g/mole}$$

$$\% \text{C} = \frac{12.01}{44.01} \times 100 = 27.29\% \text{C}$$

$$\% \text{O} = \frac{32.00}{44.01} \times 100 = 72.71\% \text{O}$$

100.00

5. $\frac{\text{g H}_2\text{O}}{\text{g BaCl}_2 \cdot 2\text{H}_2\text{O}} \times 100 = \% \text{H}_2\text{O}$

$$1\text{Ba} \times 137.33 = 137.33$$

$$2\text{Cl} \times 35.45 = 70.90$$

$$4\text{H} \times 1.01 = 4.04$$

$$2\text{O} \times 16.00 = 32.00$$

$$\left. \begin{array}{l} 4\text{H} \times 1.01 = 4.04 \\ 2\text{O} \times 16.00 = 32.00 \end{array} \right\} 36.00 \text{ g H}_2\text{O}$$

$$244.27 \text{ g}$$

$$\frac{36.00 \text{ g}}{244.27 \text{ g}} \times 100 =$$

$$14.75\% \text{H}_2\text{O}$$



$$1\text{Mg} \times 24.31 = 24.31$$

$$2\text{O} \times 16.00 = 32.00$$

$$2\text{H} \times 1.01 = 2.02$$

$$58.33 \text{ g/mol}$$

$$32.00 \text{ g O}$$

$$58.33 \text{ g Mg}(\text{OH})_2$$

$$\times 100 = 54.86\% \text{O}$$

$$175 \text{ g} \times 0.5486 = 96.0 \text{ g Oxygen}$$