

Lecture 10D: Percent Composition

The percent composition of a compound is the _____ by _____ of each element in the compound.

For example, the percent composition of NaCl: Na = 39.3%
Cl = 60.7%

So, why isn't the percent composition of NaCl 50/50?

The percent composition is based on the % _____ of each element, NOT on the % _____ of each element.

Calculate Percent Composition:

- 1 - Calculate the _____ of the compound, then
- 2 - Identify the total _____ of each _____ present.
- 3 - Divide each element _____ by the compound _____ mass

Formula: % mass =

Example 1: Calculate the weight % of sodium and chlorine in NaCl.

Step 1: Calculate the molar mass of NaCl.

$$\begin{aligned} \text{Na: } & 1 \times 23.0 \text{ g} & = \\ \text{Cl: } & 1 \times 35.5 \text{ g} & = \text{_____} \\ \text{molar mass of NaCl} & = \end{aligned}$$

Step 2: Calculate the % mass for each element:

Sodium: Calculate the total mass of just Na: _____

Calculate the % Na =

Chlorine: Calculate the total mass of just Cl: _____

Calculate the % Cl =

Step 3: Check your work! Your answer needs to add up to _____%

Summary:

Example 2: Calculate the percent composition of NH_4NO_3

Step 1: Calculate the molar mass of NH_4NO_3 .

N: =

H: =

O: = _____

molar mass of NH_4NO_3 =

Step 2: Calculate the % mass for each element:

Nitrogen: Calculate the total mass of just N: _____

Calculate the % N =

Hydrogen: Calculate the total mass of just H: _____

Calculate the % H =

Oxygen: Calculate the total mass of just O: _____

Calculate the % O =

Example 3: Find the % composition of the compound that is formed from 8.2 g Mg and 5.4 g of O_2 .

Step 1: Find the mass of the whole compound.

Step 2: Calculate the % mass for each element in the compound:

Summary:

Now let's try two dimensional analysis problems...

Example #4: Calculate the mass of hydrogen in 20.2 g potassium hydroxide, KOH.

Step 1: Calculate the molar mass of KOH.

K: =

O: =

H: = _____

molar mass of KOH =

Step 2: Use dimensional analysis to solve.

20.2 g KOH	

Example #5: Calculate the mass of hydrogen in 20.2 g C_2H_6

Step 1: Calculate the molar mass of C_2H_6 .

C: =

H: = _____

molar mass of C_2H_6 =

Step 2: Use dimensional analysis to solve.

20.2 g C_2H_6	

Summary: