

Name: Key
Blk: _____ Date: _____

Chemistry 11 PERCENT COMPOSITION

It is sometimes useful to know the percentage, by mass, of a particular element within a chemical compound.

Why?

Suppose you wanted to decompose a compound to be used as a source of oxygen. It would be useful to know the percentage of oxygen that a compound contains.

The FORMULA for calculating PERCENT COMPOSITION is :

$$\frac{\text{mass of element}}{\text{molar mass of compound}} \times 100\% \quad \left. \begin{array}{l} \text{Always} \\ \text{give answer} \\ \text{to the 1st} \\ \text{decimal place!} \end{array} \right\}$$

Example 1. What is the percent composition of EACH ELEMENT in Copper (II) Sulphide? $\therefore \text{CuS}$

$$1 \text{ Cu} = 63.5$$

$$1 \text{ S} = \frac{32.1}{95.6 \text{ g}}$$

$$\therefore \% \text{ Cu} = \frac{63.5 \text{ g}}{95.6 \text{ g}} \times 100\% = 66.4\% \text{ Cu}$$

$$\therefore \% \text{ S} = \frac{32.1 \text{ g}}{95.6 \text{ g}} \times 100\% = 33.6\% \text{ S}$$

Example 2. What is the percent composition of IRON in Iron (III) chloride? $\therefore \text{FeCl}_3$

$$1 \text{ Fe} = 55.8 \text{ g}$$

$$3 \text{ Cl} = \frac{106.5 \text{ g}}{162.3 \text{ g}}$$

$$\therefore \% \text{ Fe} = \frac{55.8 \text{ g}}{162.3 \text{ g}} \times 100\% = 34.4\% \text{ Fe}$$

Example 3. What is percent composition of WATER in Copper (II) Sulphate pentahydrate? $\therefore \text{CuSO}_4 \cdot 5 \text{H}_2\text{O}$

$$1 \text{ Cu} = 63.5$$

$$1 \text{ S} = 32.1$$

$$4 \text{ O} = 64.0$$

$$10 \text{ H} = 10.0$$

$$5 \text{ O} = \frac{80.0}{249.6 \text{ g}} > 90.0 \text{ g}$$

$$\therefore \% \text{ H}_2\text{O} = \frac{90.0 \text{ g}}{249.6 \text{ g}} \times 100\% = 36.1\% \text{ H}_2\text{O}$$

PERCENTAGE COMPOSITION

1. a) 80.0% C, 20.0% H
b) 44.0% Fe, 56.0% Cl
c) 34.4% Fe, 65.6% Cl
d) 40.0% C, 6.7% H, 53.3% O
e) 40.1% Ca, 12.0% C, 48.0% O
f) 57.5% Na, 40.0% O, 2.5% H
g) 27.3% Ca, 48.3% Cl, 2.7% H, 21.8% O
h) 28.2% N, 8.1% H, 20.8% P, 43.0% O
i) 60.8% Ag, 15.8% N, 3.4% H, 20.0% Cl
j) 62.1% C, 4.6% H, 12.8% N, 9.7% O, 10.8% Cl
k) 20.9% Sn, 45.3% S, 33.8% O
l) 10.9% N, 5.5% H, 46.2% Sn, 37.4% O
m) 20.0% C, 3.3% H, 21.3% N, 53.3% O
n) 35.6% K, 17.0% Fe, 21.9% C, 25.5% N

2. a) 24.5% b) 36.1% c) 22.9%
d) 48.6% e) 36.6% f) 6.46%
g) 54.8% h) 51.3%