Percent Composition Worksheet

1. Calculate the percent composition of each of the following.

a) $FeCl_3$ = 162.2 g

Fe

$\frac{55.85\ g\ Fe}{162.2\ g\ FeCl_3} \times 100 =$ 34.43% Fe in $FeCl_3$

Cl

$\frac{106.35\ g\ Cl}{162.2\ g\ FeCl_3} \times 100 =$ 65.57% Cl in $FeCl_3$

b) $C_2H_4N_2O_4$ = 120.08 g

C

$\frac{24.02\ g\ C}{120.08\ g\ C_2H_4N_2O_4} \times 100 =$ 20.00% C in $C_2H_4N_2O_4$

H

$\frac{4.04\ g\ H}{120.08\ g\ C_2H_4N_2O_4} \times 100 =$ 3.36% H in $C_2H_4N_2O_4$

N

$\frac{28.02\ g\ N}{120.08\ g} \times 100 =$ 23.34% N in $C_2H_4N_2O_4$ (2 N's in 1 molecule)

O

$\frac{64\ g\ O}{120.08\ g} \times 100 =$ 53.30% O in $C_2H_4N_2O_4$

2. Calculate the percentage of water in each of the following hydrates.

a) $NiSO_4 \cdot 7H_2O$ 126.14 g

$\frac{126.14\ g\ H_2O}{280.9\ g\ NiSO_4 \cdot 7H_2O}$

44.91% H_2O in $NiSO_4 \cdot 7H_2O$

b) $Ce_2(C_2O_4)_3 \cdot 9H_2O$ 162.18 g

$\frac{162.18\ g\ H_2O}{706.48\ g\ Ce_2(SO_4)_3 \cdot 7H_2O}$

22.96% H_2O in $Ce_2(C_2O_4)_3 \cdot 9H_2O$

3. Calculate the percent composition of a compound if a 9.016 g sample contains 3.940 g of phosphorous and 5.076 g of oxygen.

P

$\frac{3.940\ g\ P}{9.016\ g\ Compound} =$ 43.70% P in Compound

O

$\frac{5.076\ g\ O}{9.016\ g\ Compound} =$ 56.30% O in Compound

4. A 150.00 g sample of a compound containing carbon, hydrogen, and nitrogen was decomposed. It was found that the sample yielded 75.75 g of carbon and 66.30 g of nitrogen. What is the percent composition of the compound?

H = 7.95 g

C

75.75 g C / 150.00 g

50.502 C

H

7.95 g H / 150.00 g

5.302 H

N

66.30 g N / 150.0 g

44.202 N

5. A sample of a hydrate of iron (III) sulphate was heated and the following data was recorded:

$Fe_2(SO_4)_3$ (+3, -2)

Mass crucible and iron (III) sulphate hydrate	32.19 g
Mass crucible	27.19 g
Mass of iron (III) sulphate after first heating	30.78 g
Mass of iron (III) sulphate after second heating	30.75 g

Crucible? ← Mass of iron (III) sulphate after first heating — 3.59 g

Crucible? ← Mass of iron (III) sulphate after second heating — 3.56 g End

Calculate the percentage of water in the hydrate.

Initial Mass of Hydrate: 32.19 g − 27.19 g = 5 g Hydrate

5 g Hydrate − 3.56 Anhydrous = 1.44 g H_2O

1.44 g H_2O / 5 g Hydrate = 28.80% H_2O in Hydrate

6. A sample of a hydrate of aluminum sulphate was heated and the following data was recorded:

Mass crucible and aluminum sulphate hydrate	33.31 g
Mass crucible	21.31 g
Mass of aluminum sulphate after first heating	27.50 g
Mass of aluminum sulphate after second heating	27.47 g

12 g Start

6.16 g End

Calculate the percentage of water in the hydrate.

12 − 6.16 = 5.84 g H_2O in Hydrate

5.84 g H_2O / 12 g Hydrate = 48.67% H_2O in Hydrate