

TH-GC General Chemistry 1/5 Week 14

CrF_3 Find the molar mass and percent composition

$$\text{Cr}: 1 * 51.996 \text{ g/mol} = 51.996 \text{ g/mol}$$

$$\text{F}: 3 * 18.998 \text{ g/mol} = 56.994 \text{ g/mol}$$

$$\boxed{108.99 \text{ g/mol}} \rightarrow \text{molar mass}$$

% Composition

$$\text{Cr} \quad \frac{51.996}{108.99} * 100\% = \boxed{47.7\%}$$

$$\text{F} \quad \frac{56.994}{108.99} * 100\% = \boxed{52.3\%}$$

Find the molar mass and percent composition of H_3PO_4

$$\text{H}: 3 * 1.008 = 3.024 \text{ g/mol}$$

$$3.024 / 97.994 * 100\% = \boxed{3.1\%}$$

$$\text{P}: 1 * 30.974 = 30.974 \text{ g/mol}$$

$$30.974 / 97.994 * 100\% = \boxed{31.6\%}$$

$$\text{O}: 4 * 15.999 = 63.996 \text{ g/mol}$$

$$\boxed{97.994 \text{ g/mol}}$$

$$\frac{63.996}{97.994} * 100\% = \boxed{65.3\%}$$

How many moles of Na_3PO_4 are there in 342 g of Na_3PO_4 ?

1.) Find molar of Na_3PO_4

$$\text{Na}: 3 * 22.990 \text{ g/mol} = 68.97 \text{ g/mol}$$

$$\text{P}: 1 * 30.974 \text{ g/mol} = 30.974 \text{ g/mol}$$

$$\text{O}: 4 * 15.999 \text{ g/mol} = 63.996 \text{ g/mol}$$

$$\boxed{163.96 \text{ g/mol}}$$

$$342 \text{ g } \cancel{\text{Na}_3\text{PO}_4} * \frac{1 \text{ moles}}{163.96 \text{ g } \cancel{\text{Na}_3\text{PO}_4}} = \frac{342}{163.96} = \boxed{2.08 \text{ mol}}$$

65.5% carbon

5.5% hydrogen

29.0% oxygen

Empirical Formula $\boxed{\text{C}_3\text{H}_3\text{O}}$

* Assume we have

100 grams of substance

$$\text{Carbon } 65.5\% \rightarrow \frac{65.5 \text{ g}}{12.011 \text{ g/mol}} = \frac{5.45 \text{ mol}}{1.81} = \boxed{3}$$

$$\text{Hydrogen } 5.5\% \rightarrow \frac{5.5 \text{ g}}{1.008 \text{ g/mol}} = \frac{5.45 \text{ mol}}{1.81} = \boxed{3}$$

$$\text{oxygen } 29.0\% \rightarrow \frac{29 \text{ g}}{15.999 \text{ g/mol}} = \frac{1.81 \text{ mol}}{1.81} = \boxed{1}$$

Compound Empirical Formula of C_3H_3O

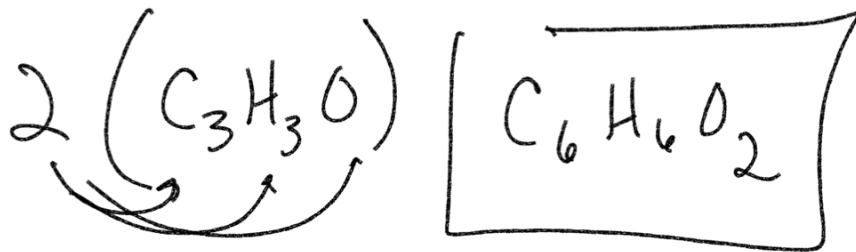
Molar Mass = 110 g/mol

Find molecular formula

$$C: 3 * 12.011 \text{ g/mol} = 36.033 \text{ g/mol}$$

$$H: 3 * 1.008 \text{ g/mol} = 3.024 \text{ g/mol}$$

$$O: 1 * 15.999 \text{ g/mol} = 15.999 \text{ g/mol}$$
$$\frac{110}{55.056} = 2$$

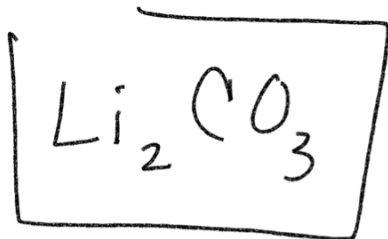


Empirical formula

18.7% Li

16.3% C

65.0% O



$$Li \frac{18.7g}{6.94g/mol} = 2.69 \text{ mol} = 2$$

$$C \frac{16.3g}{12.011g/mol} = 1.35 \text{ mol} = 1$$

$$O \frac{65g}{15.999} = 4.06 \text{ mol} = 3$$

