

EMPIRICAL FORMULA WORKSHEET

1. What is the empirical formula for a compound, which contains 0.0134 g of iron, 0.00769 g of sulfur and 0.0115 g of oxygen?

$$\text{Fe: } \frac{0.0134 \text{ g}}{55.85} = 2.4 \times 10^{-4} \text{ mol}$$

$$\text{S: } \frac{0.00769 \text{ g}}{32.065} = 2.36 \times 10^{-4} \text{ mol}$$

$$\text{Oxy: } \frac{0.0115 \text{ g}}{16 \text{ g/mol}} = 7.19 \times 10^{-4} \text{ mol}$$

$$\frac{2.4 \times 10^{-4}}{2.36 \times 10^{-4}} = 1$$

$$\frac{7.19 \times 10^{-4}}{2.36 \times 10^{-4}} = 3$$

FeS_3O_3

2. Find the empirical formula for a compound, which contains 32.8% chromium and 67.2% chlorine.

$$\text{Cr: } \frac{32.8 \text{ g}}{51.9961} = 0.631 \text{ mol}$$

$$\text{Cl: } \frac{67.2 \text{ g}}{35.45} = 1.896 \text{ mol}$$

$$\frac{0.631}{0.631} = 1$$

$$\frac{1.896}{0.631} = 3$$

CrCl_3

3. NAME the compound which contains 0.463 g TI (#81), 0.0544 g of carbon, 0.00685 g of hydrogen and 0.0725 g oxygen by finding its empirical formula.

$$\text{TI: } \frac{0.463 \text{ g}}{204.38} = 2.265 \times 10^{-3} \text{ mol}$$

$$\text{C: } \frac{0.0544 \text{ g}}{12.001} = 4.533 \times 10^{-3} \text{ mol}$$

$$\text{H: } \frac{0.00685 \text{ g}}{1.00} = 6.85 \times 10^{-3} \text{ mol}$$

$$\text{O: } \frac{0.0725 \text{ g}}{16.0} = 4.53 \times 10^{-3} \text{ mol}$$

$$\frac{2.265 \times 10^{-3}}{4.53 \times 10^{-3}} = 0.5 \times 2 = 1$$

$$\frac{4.533 \times 10^{-3}}{4.53 \times 10^{-3}} = 1 \times 2 = 2$$

$$\frac{6.85 \times 10^{-3}}{4.53 \times 10^{-3}} = 1.5 \times 2 = 3$$

$$\frac{4.53 \times 10^{-3}}{4.53 \times 10^{-3}} = 1 \times 2 = 2$$

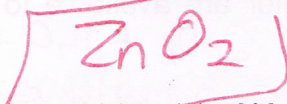
4. What is the empirical formula for a compound, which contains 67.1% zinc and the rest is oxygen?

$$\text{Zn: } \frac{67.1}{65.39} = 1.026$$

$$\text{O: } \frac{32.9}{16} = 2.06$$

$$\frac{1.026}{1.026} = 1$$

$$\frac{2.06}{1.026} = 2$$



$\text{TiC}_2\text{H}_3\text{O}_2$
Thallium Acetate

5. Barry Um has a sample of a compound, which weighs 200 grams and contains only carbon, hydrogen, oxygen and nitrogen. By analysis, he finds that it contains 97.56 grams of carbon, 4.878 g of hydrogen, 52.03 g of oxygen and 45.53 g of nitrogen. Find its empirical formula.

$$\text{C: } \frac{97.56}{12} = 8.13 \text{ mol}$$

$$\text{H: } \frac{4.878}{1} = 4.878 \text{ mol}$$

$$\text{O: } \frac{52.03}{16} = 3.25 \text{ mol}$$

$$\text{N: } \frac{45.53}{14} = 3.25 \text{ mol}$$

$$\frac{8.13}{3.25} = 2.5 \times 2 = 5$$

$$\frac{4.878}{3.25} = 1.5 \times 2 = 3$$

$$\frac{3.25}{3.25} = 1 \times 2 = 2$$

$$\frac{3.25}{3.25} = 1 \times 2 = 2$$

