Empirical formulas:

the simplest formula for a compound written in smallest whole number ratios

H_2O_2

C_2H_4

Which of these IS an empirical formula?

C_3H_6 CH_4 $C_6H_{12}O_6$ C_4H_8

Nov 17-9:28 AM

Steps for Determining Empirical Formula (Summarized)

A compound contains 4.8 g N and 8.16 g O. What is the empirical formula?

1. Start with grams (Convert % comp to grams by assuming 100 g)

4.8 g N   8.16 g O

2. Convert grams to moles.

$\frac{4.8 \text{ g N}}{14 \text{ g/mol}} = 0.34 \text{ mol N}$ $\frac{8.16 \text{ g O}}{16 \text{ g/mol}} = 0.51 \text{ mol O}$

3. Find element with **smallest** number of moles.

0.34 mol N is the smallest

4. Divide each amount of moles by smallest number of moles.

$\frac{0.34 \text{ mol N}}{0.34} = 1$ $\frac{0.51 \text{ mol O}}{0.34} = 1.5$

5. Depending on the tenths place either round to nearest whole number **OR** multiply each number the same factor to get the smallest **whole number** ratio.

can't round this! need to multiply to make whole #!

1 N x 2 = 2 N   1.5 O x 2 = 3 O

N_2O_3

Nov 17-7:06 AM

21.52 g K   8.82 g S   17.62 g O

1. Start with grams (Convert % comp to grams by assuming 100 g)

2. Convert grams to moles.

3. Find element with **smallest** number of moles.

4. Divide each amount of moles by smallest number of moles.

5. Depending on the tenths place either round to nearest whole number **OR** multiply each number the same factor to get the smallest **whole number** ratio.

1. Start with grams (Convert % comp to grams by assuming 100 g)

75% C 25% H

2. Convert grams to moles.

3. Find element with **smallest** number of moles.

4. Divide each amount of moles by smallest number of moles.

5. Depending on the tenths place either round to nearest whole number **OR** multiply each number the same factor to get the smallest **whole number** ratio.

3. $MgCl_2$

5. CaO

2. KCl

4. $MgBr_2$

Dec 14-8:38 AM

1. CH_4
2. KCl
3. $AlPO_4$
4. $MgBr_2$
5. Na_2SO_4

Dec 18-7:49 AM

1. Start with grams (Convert % comp to grams by assuming 100 g)

32.4% Na 22.5% S 45.1% O

32.4 g Na 22.5 g S 45.1 g O

2. Convert grams to moles.

$\frac{32.4\text{ g Na}}{23\text{ g/mol}} = 1.4\text{ mol}$ $\frac{22.5\text{ g S}}{32\text{ g/mol}} = 0.7\text{ mol}$ $\frac{45.1\text{ g O}}{16\text{ g/mol}} = 2.8\text{ mol}$

3. Find element with **smallest** number of moles.

.7 mol

4. Divide each amount of moles by smallest number of moles.

$\frac{1.4}{.7} = 2$ $\frac{.7}{.7} = 1$ $\frac{2.8}{.7} = 4$

5. Depending on the tenths place either round to nearest whole number **OR** multiply each number the same factor to get the smallest **whole number** ratio.

Na_2SO_4

1. K_2SO_4

2. HgO

3. $MgCl_2$

4. $BaCl_2$

5. CaO

6. $K_2Cr_2O_7$

1. Start with grams (Convert % comp to grams by assuming 100 g)

4.78 g K 6.37 g Cr 6.82 g O

2. Convert grams to moles.

$\frac{4.78\text{ g K}}{39\text{ g/mol}} = .12\text{ mol}$ $\frac{6.37\text{ g Cr}}{52\text{ g/mol}} = .12\text{ mol}$ $\frac{6.82\text{ g O}}{16\text{ g/mol}} = 0.43\text{ mol}$

3. Find element with **smallest** number of moles.

.12 mol

4. Divide each amount of moles by smallest number of moles.

$\frac{.12}{.12} = 1$ $\frac{.12}{.12} = 1$ $\frac{.43}{.12} = 3.5$

5. Depending on the tenths place either round to nearest whole number **OR** multiply each number the same factor to get the smallest **whole number** ratio.

$1 \times 2 = 2$ $1 \times 2 = 2$ $3.5 \times 2 = 7$

$K_2Cr_2O_7$