

9-11-09 p1

82.65% C

In 100g,

82.65g C

17.34% H

17.34g H

① Find moles

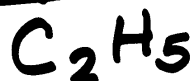
$$82.65g C \times \frac{1 \text{ mol C}}{12.0107g C} = 6.8814 \text{ mol C}$$

$$17.34g H \times \frac{1 \text{ mol H}}{1.00794g H} = 17.2034 \text{ mol H}$$

② To get mole ratio

$$\frac{17.2034 \text{ mol H}}{6.8814 \text{ mol C}} = \boxed{\frac{2.5 \text{ mol H}}{1 \text{ mol C}}}$$

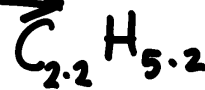
Empirical



$$\frac{5 \text{ mol H}}{2 \text{ mol C}}$$

③ Molecular Formula

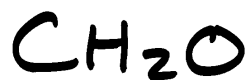
$$\frac{\text{Molar mass}}{\text{mass of emp}} = \frac{58.12 g/mol}{29.0611 g/mol} = 2$$



$$C_2H_5 = 2\left(\frac{12.0107g}{\text{mol}}\right) + 5\left(\frac{1.00794g}{\text{mol}}\right) = 29.0611g/mol$$

9-11-09 p.2

$$\begin{array}{rcccl} \frac{2.5 \text{ mol H}}{1 \text{ mol C}} & = & \textcircled{2.5} & \frac{\text{mol H}}{\text{mol C}} & \\ & & \downarrow & & \\ & & 2 \frac{1}{2} & & \\ & & & & \downarrow \\ 2 + \frac{1}{2} & & & & \\ \frac{4}{2} + \frac{1}{2} = \frac{5}{2} \rightarrow \frac{\text{mol H}}{\text{mol C}} & & & & \end{array}$$



Hydrated Compound

9-11-09 p.3

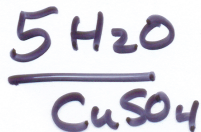
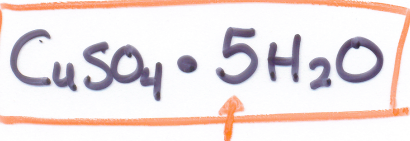


$$\begin{array}{rcl}
 1.023 \text{ g CuSO}_4 \cdot \text{X H}_2\text{O} & \text{hydrated} & \\
 - 0.654 \text{ g CuSO}_4 & \text{anhydrous} & \\
 \hline
 0.369 \text{ g} = & \text{X H}_2\text{O} &
 \end{array}$$

↳ # moles? $0.369 \text{ g} \times \frac{\text{mol}}{18.0 \text{ g}} = 0.0205 \text{ mol H}_2\text{O}$

$$0.654 \text{ g} \times \frac{\text{mol}}{159.609 \text{ g}} = 0.004 \text{ mol}$$

$$\frac{\text{mol H}_2\text{O}}{\text{mol CuSO}_4} = \frac{0.0205 \text{ mol H}_2\text{O}}{0.004 \text{ mol CuSO}_4} = 5.125 \frac{\text{H}_2\text{O}}{\text{CuSO}_4}$$



9/11/09-4

