

Combustion Analysis

Technique used to determine the amount of carbon and hydrogen in combustible compounds.

- All the carbon in the sample is converted into CO_2 .
- All the hydrogen in the sample is converted into H_2O .
- How do we use this knowledge?
 - Determine the # moles of CO_2 and H_2O
 - Determine the # moles of C and H
 - Determine the mole ratio of C to H \rightarrow empirical formula
- What if there is another element in the compound?
 - After determining the # moles of C and H, find out how many grams of each this corresponds to
 - Total mass of compound - (g of C + g of H) = mass of other element

$\text{C}_x\text{H}_y \rightarrow x\text{CO}_2 + \frac{y}{2}\text{H}_2\text{O}$

$\text{C}_x\text{H}_y\text{O}_z$

C atoms came from original sample

Example #1:

3.47g of a compound containing C, H, and F was burned. 7.51g CO_2 and 3.08g H_2O were recovered. What is the empirical formula of the compound?

Molar masses: $\text{CO}_2 = 44.01\text{g/mol}$ $\text{H}_2\text{O} = 18.016\text{g/mol}$ $\text{O} = 16.00\text{g/mol}$ $\text{F} = 19\text{g/mol}$
 $\text{C} = 12.011\text{g/mol}$ $\text{H} = 1.01\text{g/mol}$

Empirical Formula = $\text{C}_x\text{H}_y\text{F}_z$

What are x, y, and z?

