

## Answer on Question #62433, Chemistry / General Chemistry

A compound is 54.53% C, 9.15% H, and 36.32% O by mass. What is its empirical formula?

### Solution:

1) Assume 100 mg of compound present. Therefore:

Carbon: 54.53 mg

Hydrogen: 9.15 mg

Oxygen: 36.32 mg

2) Calculate moles:

Carbon:  $54.53 \cdot 10^{-3} \text{ g} / 12.011 \text{ g/mol} = 4.54 \cdot 10^{-3} \text{ mol}$

Hydrogen:  $9.15 \cdot 10^{-3} \text{ g} / 1.008 \text{ g/mol} = 9.08 \cdot 10^{-3} \text{ mol}$

Oxygen:  $36.32 \cdot 10^{-3} \text{ g} / 16.00 \text{ g/mol} = 2.27 \cdot 10^{-3} \text{ mol}$

3) Look for smallest, whole-number ratio:

Carbon:  $= 4.54 \cdot 10^{-3} \text{ mol} / 2.27 \cdot 10^{-3} \text{ mol} = 2$

Hydrogen:  $= 9.08 \cdot 10^{-3} \text{ mol} / 2.27 \cdot 10^{-3} \text{ mol} = 4$

Oxygen:  $2.27 \cdot 10^{-3} \text{ mol} / 2.27 \cdot 10^{-3} \text{ mol} = 1$

C: 2

H: 4

O: 1

The empirical formula is C<sub>2</sub>H<sub>4</sub>O

**Answer: C<sub>2</sub>H<sub>4</sub>O**