

HOMEWORK PROBLEMS:

- 4a. Calculate the Empirical formula of a compound that contains 2.40 grams of carbon, 0.333 grams of hydrogen, and 3.20 grams of oxygen

Answers:

$\frac{2.40 \text{ g C}}{12.01 \text{ g}} \times \frac{1 \text{ mol C}}{1 \text{ mol C}} = 0.1998 \text{ mol C}$ $\frac{0.333 \text{ g H}}{1.008 \text{ g}} \times \frac{1 \text{ mol H}}{1 \text{ mol H}} = 0.3304 \text{ mol H}$ $\frac{3.20 \text{ g O}}{16.0 \text{ g}} \times \frac{1 \text{ mol O}}{1 \text{ mol O}} = 0.2 \text{ mol O}$	$\frac{0.1998 \text{ mol}}{0.1998 \text{ mol}} = 1.0 \quad 1 \times 3 = 3$ $\frac{0.3304 \text{ mol}}{0.1998 \text{ mol}} = 1.654 \quad 1\frac{2}{3} \times 3 = 5$ $\frac{0.2 \text{ mol}}{0.1998 \text{ mol}} = 1.0 \quad 1 \times 3 = 3$	$\text{C}_3\text{H}_5\text{O}_3$
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- 4b. Methyl p-hydroxybenzoate is a mold inhibitor. Calculate the Empirical formula if 3.84 grams of carbon, 0.32 grams of hydrogen, and 1.92 grams of oxygen.

Answers:

$\frac{3.84 \text{ g C}}{12.01 \text{ g}} \times \frac{1 \text{ mol C}}{1 \text{ mol C}} = 0.3197 \text{ mol C}$ $\frac{0.32 \text{ g H}}{1.008 \text{ g}} \times \frac{1 \text{ mol H}}{1 \text{ mol H}} = 0.3175 \text{ mol H}$ $\frac{1.92 \text{ g O}}{16.0 \text{ g}} \times \frac{1 \text{ mol O}}{1 \text{ mol O}} = 0.12 \text{ mol O}$	$\frac{0.3197 \text{ mol}}{0.12 \text{ mol}} = 2.66 \quad 2\frac{2}{3} \times 3 = 8$ $\frac{0.3175 \text{ mol}}{0.12 \text{ mol}} = 2.65 \quad 2\frac{2}{3} \times 3 = 8$ $\frac{0.12 \text{ mol}}{0.12 \text{ mol}} = 1.0 \quad 1 \times 3 = 3$	$\text{C}_8\text{H}_8\text{O}_3$
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