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1.3 Elemental Composition of Pure Substances

AP Chemistry

Use a periodic table. Show all work with units and correct significant figures.

1. Calculate the percent composition by mass of each element in ammonium sulfate, $(NH_4)_2SO_4$.

2. Without calculating, decide which has the greater mass percent of oxygen, CO or CO_2. Justify your answer.

3. A hydrocarbon is 85.6% carbon and 14.4% hydrogen by mass. Determine its empirical formula.

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4. When magnesium burns in nitrogen, 1.459 g of Mg combines with 0.561 g of N. Determine the empirical formula of the product.

5. Caffeine is 49.5% C, 5.15% H, 28.9% N, and 16.5% O by mass, and its molar mass is 194.2 g/mol. Determine (a) the empirical formula and (b) the molecular formula.

6. Sample A contains 2.00 g S and 2.00 g O. Sample B contains 3.50 g S and 5.25 g O. Are they the same compound? Use the law of definite proportions, then find each empirical formula.

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