

1. What is the mass of 3.56×10^{24} formula units of iron (III) hydroxide?
2. How many mL of water would have the same number of representative particles as are present in 80.0 grams of NaOH. (The density of water = 1g/mL)
3. A sample of calcium carbonate contains 10.4 grams of the element oxygen. What is the mass of the entire sample of calcium carbonate?
4. How many atoms of oxygen are present in 2.50 moles of zinc perchlorate?
5. Calculate the percent composition of lead and oxygen in lead (IV) sulfate.
6. Determine the empirical formula and molecular formula of caffeine, which is composed of 49.5% carbon, 5.1 % hydrogen, 28.9% nitrogen, and 16.5% oxygen. The formula mass of caffeine is 195 amu.
7. Washing soda, a compound used to prepare hard water for washing laundry, is a hydrate. It's formula can be written $\text{Na}_2\text{CO}_3 \cdot x\text{H}_2\text{O}$. When a 2.558 gram sample of washing soda is heated, all the water of hydration is lost, leaving 0.948 grams of Na_2CO_3 . Determine the value of "x" and then write the formula for washing soda.
8. A compound contains only carbon, hydrogen, and oxygen. Combustion of 10.68 mg of the compound yields 16.01 mg of carbon dioxide and 4.37 mg of water. The molecular mass of the compound is 176.1 amu. What are the empirical and molecular formulas of the compound?

Enjoy this extra special logic problem

9. Using only these formulas: XY_2 ; X_2Z ; QZ ; what formula would you expect for a compound containing only elements Q and Y? Justify your answer.