

Chapter 10- The Mole

10.1 Chemical Measurements

Differentiate atomic mass from formula mass.

What is a mole?

Why can we assume there are 6.02×10^{23} atoms within a sample of a substance where its mass (in grams) is equivalent to its atomic or formula mass?

How many moles of...

- atoms are in 6.02×10^{23} atoms of aluminum?
- hydrogen atoms are in a mole of hydrogen gas?
- formula units are in 6.02×10^{23} formula units of calcium chloride?
- of chloride ions are in a mole of calcium chloride?

What is meant by the term representative particle?

What is Avogadro's number?

What is molar mass?

What is the molar mass of ethanol (C₂H₅OH)?

10.2 Mole Conversions

How is using the mole essential in chemistry?

What is the mass of 0.650 moles of CaCO₃?

How many moles of molecules are contained with a 100.0 gram sample of NO₂ gas?

Determine the number of atoms in a 0.112 mole sample of lead.

How many moles of sodium iodide contain 7.9×10^{24} formula units?

If you burned 4.0×10^{24} molecules of propane (C_3H_8) during a laboratory experiment, what mass of propane did you burn?

How many bicarbonate ions are in 1.8 grams of sodium bicarbonate (baking soda)?

What condition does STP refer to?

What is molar volume?

A chemical reaction produces 0.82 moles of carbon dioxide gas. What volume will this gas occupy at STP?

A room with a volume of 4.000×10^3 L contains how many representative particles of air at STP?

Draw Figure 10-22 on page 330 and write the conversions required to move between the boxes next to the double-sided arrows.

10.3 Empirical and Molecular Formulas

What is percentage composition?

What is the percentage composition of Al_2O_3 ?

Find the percentage composition of a compound containing 4.60 grams of sodium, 3.20 grams of oxygen, and 0.200 grams of hydrogen.

What does the empirical formula of a compound represent?

Determine the empirical formula for a compound with a percentage composition of 54.1% calcium, 43.2% oxygen, and 2.70% hydrogen.

Determine the empirical formula for a compound containing 3.65 grams of sodium, 2.54 grams of sulfur, and 3.81 grams of oxygen.

What does the molecular formula of a compound represent?

Differentiate molar (formula) mass from empirical formula mass.

Find the molecular formula for a compound with a percentage composition of 30.4% nitrogen and 69.6% oxygen. The molar mass of the compound is 92.0 g/mol.