

Tutorial 7: Writing Balanced Chemical Equations

Goals:

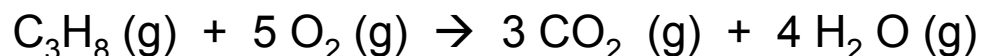
- ✓ Be able to write a proper balanced chemical equation.
- ✓ Be able to understand the information given in a balanced chemical equation.

Writing Chemical Equations

- The law of conservation of mass is based on the concept that atoms are not created or destroyed, but are just rearranged when a chemical reaction occurs. This is why we must balance chemical equations so that the number of atoms of each element on the reactant side is equal to that on the product side.

- **Example:**

Propane gas reacts with oxygen gas to form carbon dioxide gas and water vapor.



- **Terminology of reactions:**

Reactants: Propane and oxygen

Products: Carbon dioxide and water

Coefficients: 1, 5, 3, 4

Subscripts: 3, 8, 2, 2, 2

- **Abbreviations used in reaction:**

+: written between multiple reactants or products

Δ : written above the arrow to indicate heat added to a reaction

(s): indicates a substance in the solid state

(l): indicates a substance in the liquid state

(g): indicates a substance in the gaseous state

(aq): indicates a substance dissolved in water

Give It A Try!

1. Solid aluminum reacts with hydrochloric acid to form aqueous aluminum chloride and hydrogen gas.
 - a. Write the equation: $\text{Al (s)} + \text{HCl (aq)} \rightarrow \text{AlCl}_3 \text{ (aq)} + \text{H}_2 \text{ (g)}$
 - b. Tally up the number of each atom on the reactant and product side of the equation
 - c. Change the coefficients to balance the reactant side with the product side
 - i. Do not start with an element that is already balanced
 - ii. Do not start with the most difficult element
 - iii. When a polyatomic ion appears in the reactant and product, keep that polyatomic ion together and balance it as you would an individual element
2. Sodium metal reacts with water to form aqueous sodium hydroxide and hydrogen gas.
3. Aqueous aluminum sulfate reacts with aqueous barium iodide to form solid barium sulfate and aqueous aluminum iodide.