

Representing Chemical Reactions

Chemical Equations

= statement conveying information about a chemical reaction

- two ways of describing chemical equations: Word Equations
Molecular (Formula) Equations

1. Word Equations

- verbally describe chemical reactions
- have the following pattern:

Name of reactant 1() + name of reactant 2() → name of product 1() + name of product 2()

- **Reactants**

- : are the substances with which you begin the reaction
- : a plus sign is used between the reactants when there is more than one reactant

- **Products**

- : are the substances made as a result of the reaction
- : a plus sign is used between the products when there is more than one product

- **Arrow(s)**

- : indicates the direction in which the reaction is running, therefore determining the reactants and products of the reaction
- = yields or gives us

- **State of Matter**

- : behind the name of each reactant & product name the state of the substance in brackets using the short form --
 - solid (**s**)
 - liquid (**l**)
 - gas (**g**)
 - aqueous (**aq**) (dissolved in water or in solution form)

- **Entropy**

- = energy absorbed or released during a chemical reaction
- : is included in the word equation just like any other reactant or product.
 - a) exothermic
 - = written on products side
 - b) endothermic
 - = written on reactants side

- **Diatomic Elements**

= form molecules composed of 2 atoms of the same element

: there are 8 diatomic elements, all are gases = O, N, F, Cl, Br, I, At, and H

- seven form a '7' on the periodic table plus Hydrogen

: these elements are never found as single atoms in nature, instead they are always found as diatomic molecules

- this means that H is always found as H₂, N is always N₂, etc.

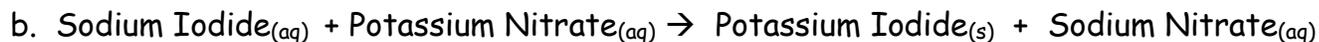
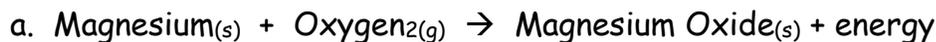
Examples:

a. Gaseous hydrogen and gaseous oxygen react explosively to form water vapor.

b. A solution of sodium iodide is added to a solution of potassium nitrate to make a potassium iodide precipitate and a sodium nitrate solution.

2. Molecular (Formula) Equations

- represent chemical reactions using the chemical formulas of the substances involved.



Word Equations

For each of the following:

- a) rewrite the statement as a Word Equation
- b) rewrite the word equation as a Molecular Equation

1. When zinc metal and sulfur powder are heated, they form solid zinc sulfide.

2. Aluminum metal plus hydrogen chloride gas yields solid aluminum chloride plus hydrogen gas.

3. Zinc metal plus oxygen gas produces solid zinc oxide.

4. Magnesium metal plus gaseous carbon dioxide yields solid magnesium oxide plus solid carbon.

5. Sodium metal plus chlorine gas combine to form solid sodium chloride.

6. Water vapour is formed from the explosive reaction between hydrogen gas and oxygen gas.

7. Silverware reacts with the sulfur in the air to become tarnished, producing silver sulfide.

8. Iron reacts with the oxygen in the air to form rust (which is iron oxide).

9. When sodium metal is placed in a beaker of water, hydrogen gas and a sodium hydroxide solution are formed.

10. When zinc metal is placed in a solution of hydrochloric acid, hydrogen gas and a zinc chloride solution are formed. The container gets warm.

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