

Chemical Reactions



Chemical Reaction

- _____ – process by which the atoms of one or more substance are rearranged to form different substances
- A chemical reaction is also called a _____

Did a Chemical Reaction Take Place?

- There are several ways to tell if a chemical reaction has occurred...
 - _____
 - _____
 - _____
 - _____
 - _____

Writing Chemical Equations

- A substance that undergoes a reaction is called a _____.
 - Reactants are written on the left of the arrow
 - These will be the things you start with
- When reactants undergo a chemical change, each new substance formed is called a _____.
 - Products are written on the right of the arrow
 - These are the things that you produce
- Reactants → Products

Writing Chemical Equations

- _____ – starting chemicals
- _____ – substances that are formed
- + separates substances (usually read as “and”)
- → separates reactants from products (usually read as gives, produces, or yields)
- **Reactant 1 + Reactant 2 → Product 1 + Product 2**

Writing Chemical Equations

- (s) – _____
- (l) – _____
- (g) – _____
- (aq) – _____

Word Equations

- The simplest way to represent a reaction is by using words to describe all the reactants and products, with an arrow placed between them to represent change.
- Like:
Solid iron and chlorine gas react to produce solid iron (III) chloride

Skeleton Equations

- Word equations can be converted into skeleton equations by substituting chemical formulas for the names of compounds and elements.

Skeleton Equations

- In order to write equations you **MUST** remember your diatomic elements...
- Br I N Cl H O F

Skeleton Equations

- Try the word equation we just looked at
- Solid iron and chlorine gas react to produce solid iron (III) chloride

Try this example...

- Write the skeleton equation for solid magnesium reacting with oxygen gas to give solid magnesium oxide

Try this example...

- Write the skeleton equation for solid carbon reacting with solid sulfur to produce liquid carbon disulfide

Try this example...

- Write the skeleton equation for solid calcium reacting with chlorine gas to produce solid calcium chloride

Skeleton Equation vs. Chemical Equation

- In a chemical equation the Law of conservation of matter MUST be observed!
- This means the # of atoms of reactants = the # of atoms of products
- What you start with has to equal what you end with

Balancing Chemical Equations

- For a chemical equation to accurately represent a reaction, the same number of each kind of atom must be on the left side of the arrow as are on the right side.

Steps for Balancing Chemical Equations

1. Write the _____ for the reaction
2. Count the number of atoms of each element of the _____
3. Count the number of atoms of each element of the _____
4. Add / Change the _____ to make the numbers of each element equal
5. YOU CAN NEVER CHANGE A _____ !
6. Write the coefficients in the lowest possible ratio
7. Check your work

Definitions

- _____ – the numbers at the bottom of a chemical formula.
- $\text{CaCl}_2 \dots \text{H}_2\text{O} \dots \text{Na}_3\text{PO}_4$
- These CANNOT be changed

- _____ – these will be the numbers that you will put in front of the chemical formulas.
- These CAN be changed

Examples

- Write the balanced chemical equation for the reaction between hydrogen and chlorine to give hydrochloric acid

More examples

- Write and balance the reaction between sodium hydroxide and calcium bromide to give calcium hydroxide and sodium bromide

More examples

- Write and balance the reaction for potassium iodide reacting with lead (II) nitrate to form potassium nitrate and lead (II) iodide