

Name: _____ Date: _____
Chemistry

Class Notes

Chemical Reactions



Chemical reactions always involve the **changing** of certain substances into **new** substances with different chemical and physical properties.

In other words, a **chemical reaction** is the breaking of chemical bonds and then **rearranging the atoms or ions to form new bonds and new substances**. The substance or substances that the reaction started with are called the **reactants** and the new substance or substances created are called **products**.



Chemical reactions undergo physical and chemical changes in which **new substances are always created** and **energy is either absorbed or released**. It is these characteristics that help determine whether a reaction has occurred.

Signs of a Chemical Reaction

- _____
- _____
- _____
- _____
- _____

In order for a chemical reaction to occur there must be sufficient energy to start the reaction. This energy is the **activation energy** and may come from the reactants or another source.

A reaction that starts without added energy has a low activation energy and is called a **spontaneous reaction**. A reaction with a high activation energy is non-spontaneous and can be very slow. In order to speed up some reactions a **catalyst** is used to lower the activation energy and thereby hurry the reaction.

If energy is released during a reaction, the products will have less energy than the reactants and is **exothermic**. However, if the reactants absorbed energy the products will have more energy than the reactants and is **endothermic**.

The key to understanding and recognizing chemical reactions is knowing how chemical bonds are formed to create compounds. You can use your knowledge of ionic charges, oxidation numbers and the octet rule to determine how a reaction might occur.

“Without legends, dreams die. When dreams die, there is no opportunity for greatness.” – Old Adage

Types of Chemical Reactions

Chemists classify chemical reactions in order to help predict the products of chemical reactions. There are five main types of chemical reactions but not all reactions can be easily classified.

_____	$A + B \rightarrow AB$
_____	$AB \rightarrow A + B$
_____	$A + BC \rightarrow AC + B$
_____	$AB + CD \rightarrow AD + CB$
_____	$C_xH_y + O_2 \rightarrow CO_2 + H_2O$

Classifying Chemical Reactions

_____	$CaCO_3 (s) \rightarrow CaO (s) + CO_2 (g)$
_____	$Ba (s) + 2 HCl (aq) \rightarrow BaCl_2 (aq) + H_2 (g)$
_____	$Pb(NO_3)_2 (aq) + MgSO_4 (aq) \rightarrow Mg(NO_3)_2 (aq) + PbSO_4 (s)$
_____	$SO_3 (g) + H_2O (l) \rightarrow H_2SO_4 (l)$
_____	$Cl_2 (g) + 2 NaI (aq) \rightarrow 2 NaCl (aq) + I_2 (aq)$
_____	$2 KClO_3 (s) \rightarrow 2 KCl (s) + 3 O_2 (g)$
_____	$CaCl_2 (aq) + Na_2SO_4 (aq) \rightarrow CaSO_4 (s) + NaCl (aq)$
_____	$Zn (s) + HCl (aq) \rightarrow ZnCl_2 (aq) + H_2 (g)$

**"If everyone is thinking alike, then somebody isn't thinking."
~ George S. Patton**