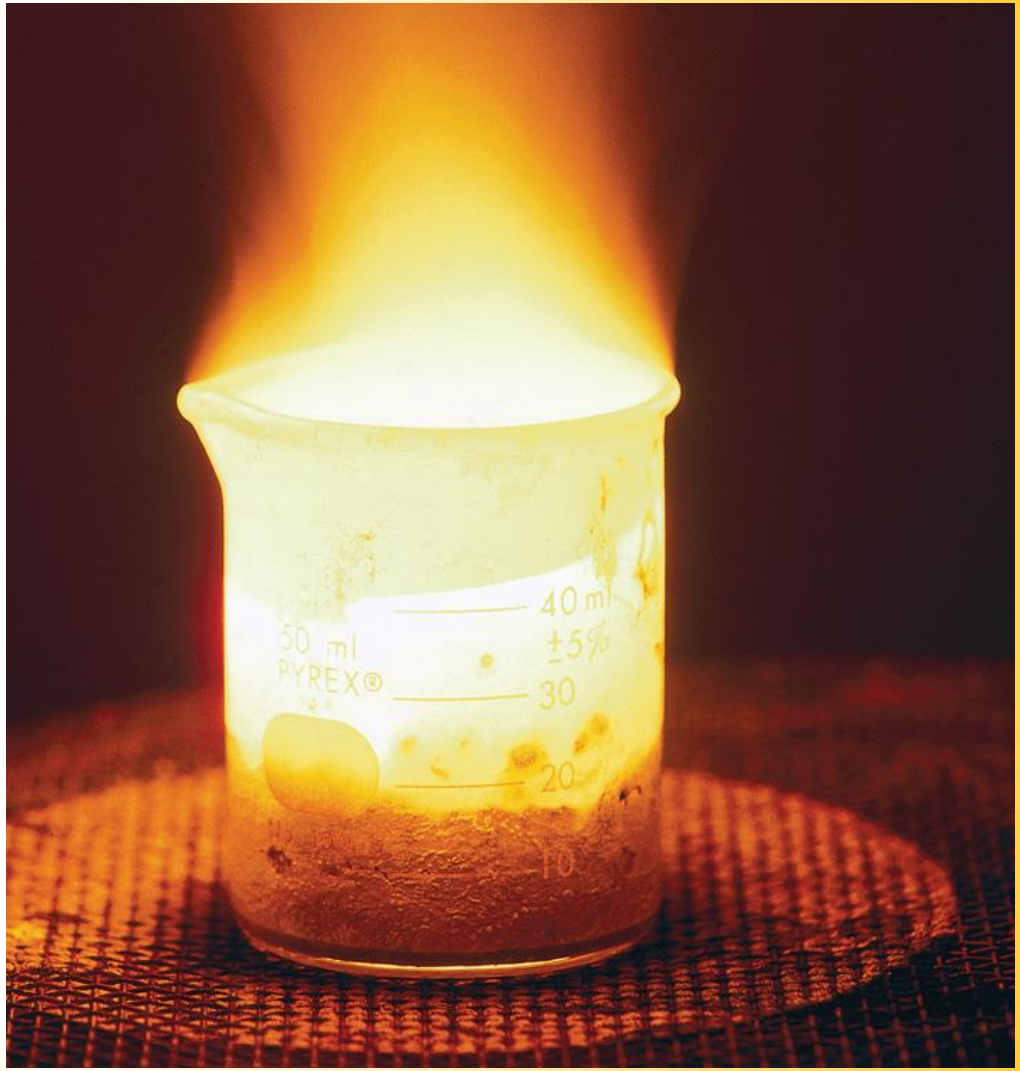
Types of Chemical Reactions: Double Displacement Reactions

Note: Slides contain audio. Click icon in bottom right corner to play.



ROSEDALE ACADEMY

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There are millions of chemical reactions that are known to occur. Among these millions of reactions, certain types display similar characteristics. As a result, chemists are able to group reactions into 4 basic types to help organize these known reactions and to help chemists predict the products of unknown reactions.

Synthesis

Decomposition

Single Displacement

Double Displacement

Click to learn about single displacement reactions

Click this icon to play audio

Double Displacement Reactions

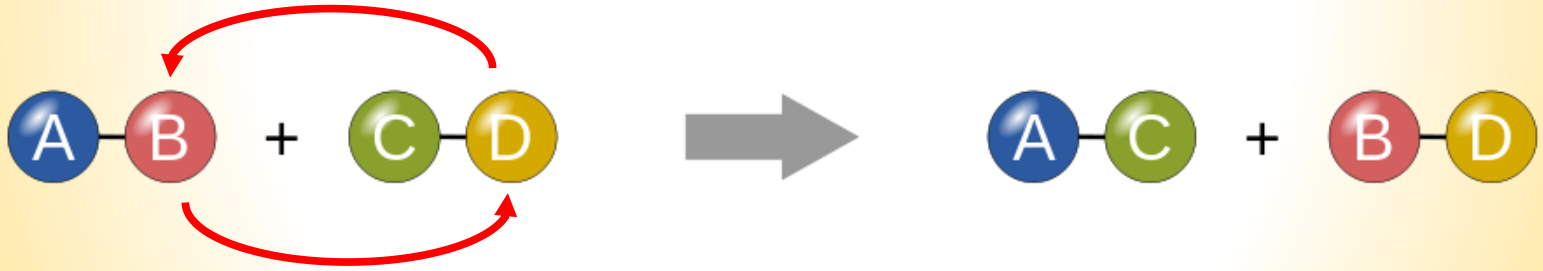
Recall that negative ions (-) are called anions and positive ions (+) are called cations. In a double displacement reaction the anions and cations of different molecules switch places (or displace each other) to form two different product compounds. Given this information, try to predict the general formula for a double displacement reaction.

Click for the General Formula for a Double Displacement Reaction

Double Displacement Reactions

In a double displacement reaction the anions and cations of different compounds switch places (or displace each other) to form two different product compounds. The general formula for a double displacement reaction is:

$$AB + CD \rightarrow AC + BD$$



As you can see, in this reaction, the anion D switches places with the anion B to form the products AD and CB.

Double Displacement Reaction Example

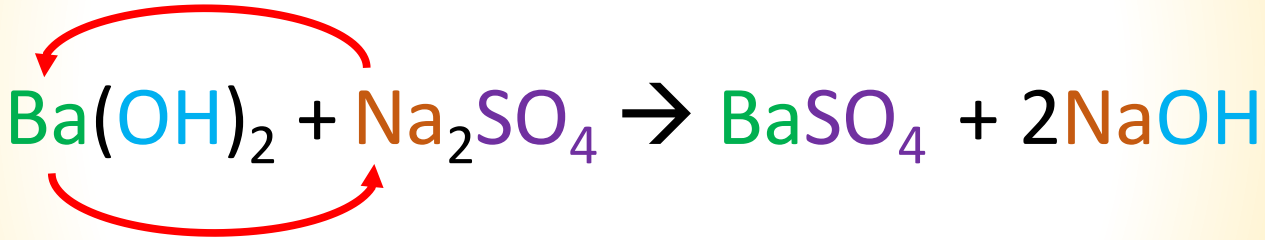
A good example of a double displacement reaction is the reaction between barium hydroxide ($Ba(OH)_2$) and sodium sulfate (Na_2SO_4). Based on what you know about double displacement reactions try to predict the products of this reaction and write the balanced chemical equation.

Balanced Double Displacement Reaction Equation

A good example of a double displacement reaction is the reaction between barium hydroxide ($Ba(OH)_2$) and sodium sulfate (Na_2SO_4). The balanced chemical equation for this double displacement reaction is:

$$Ba(OH)_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaOH$$

Notice how the cations Ba and Na have switched places in the product compounds:



Test Your Understanding

Test your understanding:

Which of the following reactions is a double displacement reaction? (Click the box with the correct answer.)

$CO_2 + H_2O \rightarrow H_2CO_3$

$C_2H_8 + O_2 \rightarrow 2CO_2 + 4H_2O$

$2Fe + 6NaBr \rightarrow 2FeBr_3 + 6\ Na$

$BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$

Incorrect. Try again:

Which of the following reactions is a decomposition reaction? (Click the box with the correct answer.)

$CO_2 + H_2O \rightarrow H_2CO_3$

$C_2H_8 + O_2 \rightarrow 2CO_2 + 4H_2O$

$2Fe + 6NaBr \rightarrow 2FeBr_3 + 6\ Na$

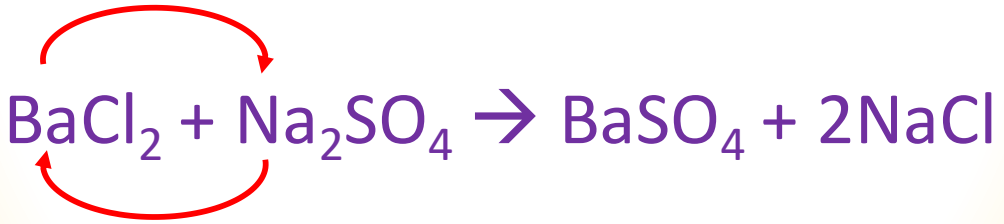
$BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$

Correct

In the reaction:

$$BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$$

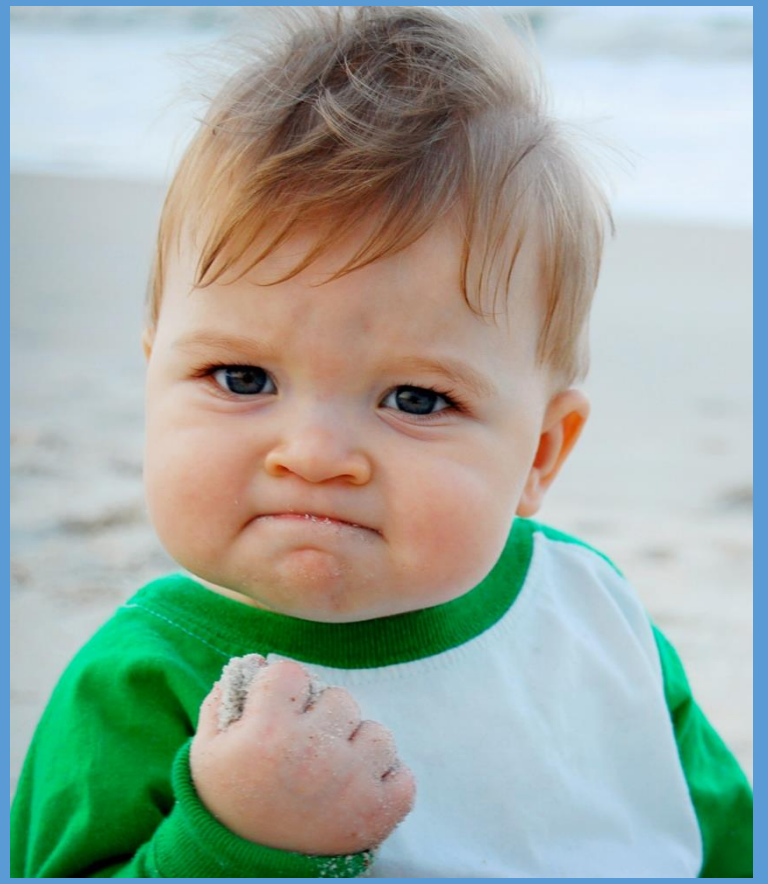
The cations Ba and Na switch (displace) with each other forming two new product compounds.



Success!

Success!

You have reached the end of this activity. You will know that you have achieved the goals for this activity when you can describe and identify double displacement reactions and can give examples of these reactions.



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