

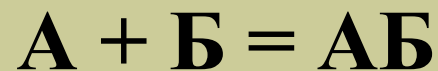
Учитель химии МКОУ СОШ 15 г.Лиски Решетников Е.А.

# ТИПЫ ХИМИЧЕСКИХ РЕАКЦИЙ

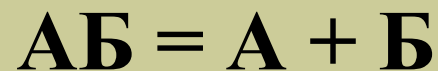
коэффициенты

# Основные типы химических реакций.

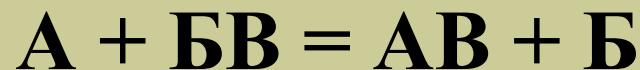
**Реакции соединения**



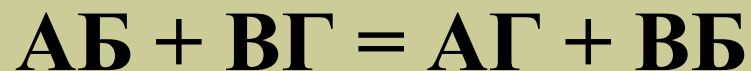
**Реакции  
разложения**



**Реакции замещения**



**Реакции обмена**



**УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:**  
*реакции соединения*

№	1 ВАРИАНТ	
1	$Mg + O_2 = MgO$	$2 Mg + O_2 = 2 MgO$
2	$K + H_2O = KOH + H_2 \uparrow$	
3	$Fe + H_2SO_4 = FeSO_4 + H_2 \uparrow$	
4	$Zn + Cu(NO_3)_2 = Cu + Zn(NO_3)_2$	
5	$CaO + H_2O = Ca(OH)_2$	$CaO + H_2O = Ca(OH)_2$
6	$CaO + H_3PO_4 =$ $Ca_3(PO_4)_2 + H_2O$	
7	$NaOH + H_2S = Na_2S + H_2O$	
8	$BaCl_2 + Na_2SO_4 = BaSO_4 \downarrow + NaCl$	
9	$CO_2 + H_2O \leftrightarrow H_2CO_3$	$CO_2 + H_2O \leftrightarrow H_2CO_3$

# УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:

## *реакции соединения*

2 ВАРИАНТ		
1	$\text{Fe} + \text{CuCl}_2 = \text{Cu} + \text{FeCl}_2$	
2	$\text{P} + \text{O}_2 = \text{P}_2\text{O}_5$	$4 \text{P} + 5 \text{O}_2 = 2 \text{P}_2\text{O}_5$
3	$\text{Mg} + \text{HCl} = \text{MgCl}_2 + \text{H}_2$	
4	$\text{Al}_2\text{O}_3 + \text{HCl} = \text{AlCl}_3 + \text{H}_2\text{O}$	
5	$\text{P}_2\text{O}_5 + \text{H}_2\text{O} = \text{H}_3\text{PO}_4$	$\text{P}_2\text{O}_5 + 3 \text{H}_2\text{O} = 2 \text{H}_3\text{PO}_4$
6	$\text{Ba}(\text{OH})_2 + \text{HNO}_3 =$ $\text{Ba}(\text{NO}_3)_2 + \text{H}_2\text{O}$	
7	$\text{Ca} + \text{H}_2\text{O} = \text{Ca}(\text{OH})_2 + \text{H}_2$	
8	$\text{AgNO}_3 + \text{KCl} = \text{AgCl} + \text{KNO}_3$	
9	$\text{Fe}(\text{OH})_3 = \text{Fe}_2\text{O}_3 + \text{H}_2\text{O}$	

# УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:

## *реакции соединения*

3 ВАРИАНТ		
1	$\text{Cu} + \text{O}_2 = \text{CuO}$	$2 \text{Cu} + \text{O}_2 = 2 \text{CuO}$
2	$\text{Fe}_2\text{O}_3 + \text{HCl} = \text{FeCl}_3 + \text{H}_2\text{O}$	
3	$\text{Ba} + \text{H}_2\text{O} = \text{Ba}(\text{OH})_2 + \text{H}_2$	
4	$\text{SO}_2 + \text{H}_2\text{O} \leftrightarrow \text{H}_2\text{SO}_3$	$\text{SO}_2 + \text{H}_2\text{O} \leftrightarrow \text{H}_2\text{SO}_3$
5	$\text{CuCl}_2 + \text{KOH} = \text{Cu}(\text{OH})_2 + \text{KCl}$	
6	$\text{Ca}(\text{OH})_2 + \text{HNO}_3 =$ $\text{Ca}(\text{NO}_3)_2 + \text{H}_2\text{O}$	
7	$\text{AgNO}_3 + \text{NaBr} = \text{AgBr} + \text{NaNO}_3$	
8	$\text{Cu} + \text{Hg}(\text{NO}_3)_2 = \text{Cu}(\text{NO}_3)_2 + \text{Hg}$	
9	$\text{Mg} + \text{HCl} = \text{MgCl}_2 + \text{H}_2$	

**УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:**  
*реакции соединения*

№	4 ВАРИАНТ	
1	$\text{Na} + \text{H}_2\text{O} = \text{NaOH} + \text{H}_2 \uparrow$	
2	$\text{Zn} + \text{Pb}(\text{NO}_3)_2 = \text{Pb} + \text{Zn}(\text{NO}_3)_2$	
3	$\text{Mg} + \text{H}_2\text{SO}_3 = \text{MgSO}_3 + \text{H}_2 \uparrow$	
4	$\text{H}_2 + \text{O}_2 = \text{H}_2\text{O}$	$2 \text{H}_2 + \text{O}_2 = 2 \text{H}_2\text{O}$
5	$\text{Cu}(\text{OH})_2 = \text{CuO} + \text{H}_2\text{O}$	
6	$\text{CaCO}_3 + \text{HCl} =$ $\text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$	
7	$\text{HBr} + \text{NaOH} = \text{NaBr} + \text{H}_2\text{O}$	
8	$\text{AgNO}_3 + \text{KI} = \text{AgI} + \text{KNO}_3$	
9	$\text{Na}_2\text{O} + \text{H}_2\text{O} = \text{NaOH}$	$\text{Na}_2\text{O} + \text{H}_2\text{O} = 2 \text{NaOH}$

**УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:**  
*реакции разложения*

№	1 ВАРИАНТ	
1	$\text{Mg} + \text{O}_2 = \text{MgO}$	
2	$\text{K} + \text{H}_2\text{O} = \text{KOH} + \text{H}_2 \uparrow$	
3	$\text{Fe} + \text{H}_2\text{SO}_4 = \text{FeSO}_4 + \text{H}_2 \uparrow$	
4	$\text{Zn} + \text{Cu}(\text{NO}_3)_2 = \text{Cu} + \text{Zn}(\text{NO}_3)_2$	
5	$\text{CaO} + \text{H}_2\text{O} = \text{Ca}(\text{OH})_2$	
6	$\text{CaO} + \text{H}_3\text{PO}_4 =$ $\text{Ca}_3(\text{PO}_4)_2 + \text{H}_2\text{O}$	
7	$\text{NaOH} + \text{H}_2\text{S} = \text{Na}_2\text{S} + \text{H}_2\text{O}$	
8	$\text{BaCl}_2 + \text{Na}_2\text{SO}_4 = \text{BaSO}_4 \downarrow + \text{NaCl}$	
9	$\text{CO}_2 + \text{H}_2\text{O} \leftrightarrow \text{H}_2\text{CO}_3$	$\text{CO}_2 + \text{H}_2\text{O} \leftrightarrow \text{H}_2\text{CO}_3$

# УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:

## *реакции разложения*

	2 ВАРИАНТ	
1	$\text{Fe} + \text{CuCl}_2 = \text{Cu} + \text{FeCl}_2$	
2	$\text{P} + \text{O}_2 = \text{P}_2\text{O}_5$	
3	$\text{Mg} + \text{HCl} = \text{MgCl}_2 + \text{H}_2$	
4	$\text{Al}_2\text{O}_3 + \text{HCl} = \text{AlCl}_3 + \text{H}_2\text{O}$	
5	$\text{P}_2\text{O}_5 + \text{H}_2\text{O} = \text{H}_3\text{PO}_4$	
6	$\text{Ba}(\text{OH})_2 + \text{HNO}_3 =$ $\text{Ba}(\text{NO}_3)_2 + \text{H}_2\text{O}$	
7	$\text{Ca} + \text{H}_2\text{O} = \text{Ca}(\text{OH})_2 + \text{H}_2$	
8	$\text{AgNO}_3 + \text{KCl} = \text{AgCl} + \text{KNO}_3$	
9	$\text{Fe}(\text{OH})_3 = \text{Fe}_2\text{O}_3 + \text{H}_2\text{O}$	$2 \text{Fe}(\text{OH})_3 = \text{Fe}_2\text{O}_3 + 3 \text{H}_2\text{O}$



# УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:

## *реакции разложения*

	3 ВАРИАНТ	
1	$\text{Cu} + \text{O}_2 = \text{CuO}$	
2	$\text{Fe}_2\text{O}_3 + \text{HCl} = \text{FeCl}_3 + \text{H}_2\text{O}$	
3	$\text{Ba} + \text{H}_2\text{O} = \text{Ba}(\text{OH})_2 + \text{H}_2$	
4	$\text{SO}_2 + \text{H}_2\text{O} \leftrightarrow \text{H}_2\text{SO}_3$	$\text{SO}_2 + \text{H}_2\text{O} \leftrightarrow \text{H}_2\text{SO}_3$
5	$\text{CuCl}_2 + \text{KOH} = \text{Cu}(\text{OH})_2 + \text{KCl}$	
6	$\text{Ca}(\text{OH})_2 + \text{HNO}_3 =$ $\text{Ca}(\text{NO}_3)_2 + \text{H}_2\text{O}$	
7	$\text{AgNO}_3 + \text{NaBr} = \text{AgBr} + \text{NaNO}_3$	
8	$\text{Cu} + \text{Hg}(\text{NO}_3)_2 = \text{Cu}(\text{NO}_3)_2 + \text{Hg}$	
9	$\text{Mg} + \text{HCl} = \text{MgCl}_2 + \text{H}_2$	

**УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:**  
*реакции разложения*

№	4 ВАРИАНТ	
1	$\text{Na} + \text{H}_2\text{O} = \text{NaOH} + \text{H}_2 \uparrow$	
2	$\text{Zn} + \text{Pb}(\text{NO}_3)_2 = \text{Pb} + \text{Zn}(\text{NO}_3)_2$	
3	$\text{Mg} + \text{H}_2\text{SO}_3 = \text{MgSO}_3 + \text{H}_2 \uparrow$	
4	$\text{H}_2 + \text{O}_2 = \text{H}_2\text{O}$	
5	$\text{Cu}(\text{OH})_2 = \text{CuO} + \text{H}_2\text{O}$	$\text{Cu}(\text{OH})_2 = \text{CuO} + \text{H}_2\text{O}$
6	$\text{CaCO}_3 + \text{HCl} =$ $\text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$	
7	$\text{HBr} + \text{NaOH} = \text{NaBr} + \text{H}_2\text{O}$	
8	$\text{AgNO}_3 + \text{KI} = \text{AgI} + \text{KNO}_3$	
9	$\text{Na}_2\text{O} + \text{H}_2\text{O} = \text{NaOH}$	

**УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:**  
*реакции замещения*

№	1 ВАРИАНТ	
1	$Mg + O_2 = MgO$	
2	$K + H_2O = KOH + H_2 \uparrow$	$2 K + 2 H_2O = 2 KOH + H_2 \uparrow$
3	$Fe + H_2SO_4 = FeSO_4 + H_2 \uparrow$	$Fe + H_2SO_4 = FeSO_4 + H_2 \uparrow$
4	$Zn + Cu(NO_3)_2 = Cu + Zn(NO_3)_2$	$Zn + Cu(NO_3)_2 = Cu + Zn(NO_3)_2$
5	$CaO + H_2O = Ca(OH)_2$	
6	$CaO + H_3PO_4 =$ $Ca_3(PO_4)_2 + H_2O$	
7	$NaOH + H_2S = Na_2S + H_2O$	
8	$BaCl_2 + Na_2SO_4 = BaSO_4 \downarrow + NaCl$	
9	$CO_2 + H_2O \leftrightarrow H_2CO_3$	

# УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:

## *реакции замещения*

	2 ВАРИАНТ	
1	$\text{Fe} + \text{CuCl}_2 = \text{Cu} + \text{FeCl}_2$	$\text{Fe} + \text{CuCl}_2 = \text{Cu} + \text{FeCl}_2$
2	$\text{P} + \text{O}_2 = \text{P}_2\text{O}_5$	
3	$\text{Mg} + \text{HCl} = \text{MgCl}_2 + \text{H}_2$	$\text{Mg} + 2 \text{HCl} = \text{MgCl}_2 + \text{H}_2$
4	$\text{Al}_2\text{O}_3 + \text{HCl} = \text{AlCl}_3 + \text{H}_2\text{O}$	
5	$\text{P}_2\text{O}_5 + \text{H}_2\text{O} = \text{H}_3\text{PO}_4$	
6	$\text{Ba}(\text{OH})_2 + \text{HNO}_3 =$ $\text{Ba}(\text{NO}_3)_2 + \text{H}_2\text{O}$	
7	$\text{Ca} + \text{H}_2\text{O} = \text{Ca}(\text{OH})_2 + \text{H}_2$	$\text{Ca} + 2 \text{H}_2\text{O} = \text{Ca}(\text{OH})_2 + \text{H}_2$
8	$\text{AgNO}_3 + \text{KCl} = \text{AgCl} + \text{KNO}_3$	
9	$\text{Fe}(\text{OH})_3 = \text{Fe}_2\text{O}_3 + \text{H}_2\text{O}$	

# УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:

## *реакции замещения*

3 ВАРИАНТ		
1	$\text{Cu} + \text{O}_2 = \text{CuO}$	
2	$\text{Fe}_2\text{O}_3 + \text{HCl} = \text{FeCl}_3 + \text{H}_2\text{O}$	
3	$\text{Ba} + \text{H}_2\text{O} = \text{Ba}(\text{OH})_2 + \text{H}_2$	$\text{Ba} + 2 \text{H}_2\text{O} = \text{Ba}(\text{OH})_2 + \text{H}_2$
4	$\text{SO}_2 + \text{H}_2\text{O} \leftrightarrow \text{H}_2\text{SO}_3$	
5	$\text{CuCl}_2 + \text{KOH} = \text{Cu}(\text{OH})_2 + \text{KCl}$	
6	$\text{Ca}(\text{OH})_2 + \text{HNO}_3 =$ $\text{Ca}(\text{NO}_3)_2 + \text{H}_2\text{O}$	
7	$\text{AgNO}_3 + \text{NaBr} = \text{AgBr} + \text{NaNO}_3$	
8	$\text{Cu} + \text{Hg}(\text{NO}_3)_2 = \text{Cu}(\text{NO}_3)_2 + \text{Hg}$	$\text{Cu} + \text{Hg}(\text{NO}_3)_2 = \text{Cu}(\text{NO}_3)_2 + \text{Hg}$
9	$\text{Mg} + \text{HCl} = \text{MgCl}_2 + \text{H}_2$	$\text{Mg} + 2 \text{HCl} = \text{MgCl}_2 + \text{H}_2$

**УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:**  
*реакции замещения*

№	4 ВАРИАНТ	
1	$\text{Na} + \text{H}_2\text{O} = \text{NaOH} + \text{H}_2 \uparrow$	$2 \text{Na} + 2 \text{H}_2\text{O} = 2 \text{NaOH} + \text{H}_2$
2	$\text{Zn} + \text{Pb}(\text{NO}_3)_2 = \text{Pb} + \text{Zn}(\text{NO}_3)_2$	$\text{Zn} + \text{Pb}(\text{NO}_3)_2 = \text{Pb} + \text{Zn}(\text{NO}_3)_2$
3	$\text{Mg} + \text{H}_2\text{SO}_3 = \text{MgSO}_3 + \text{H}_2 \uparrow$	$\text{Mg} + \text{H}_2\text{SO}_3 = \text{MgSO}_3 + \text{H}_2 \uparrow$
4	$\text{H}_2 + \text{O}_2 = \text{H}_2\text{O}$	
5	$\text{Cu}(\text{OH})_2 = \text{CuO} + \text{H}_2\text{O}$	
6	$\text{CaCO}_3 + \text{HCl} =$ $\text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$	
7	$\text{HBr} + \text{NaOH} = \text{NaBr} + \text{H}_2\text{O}$	
8	$\text{AgNO}_3 + \text{KI} = \text{AgI} + \text{KNO}_3$	
9	$\text{Na}_2\text{O} + \text{H}_2\text{O} = \text{NaOH}$	

**УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:**  
*реакции обмена*

№	1 ВАРИАНТ	
1	$Mg + O_2 = MgO$	
2	$K + H_2O = KOH + H_2 \uparrow$	
3	$Fe + H_2SO_4 = FeSO_4 + H_2 \uparrow$	
4	$Zn + Cu(NO_3)_2 = Cu + Zn(NO_3)_2$	
5	$CaO + H_2O = Ca(OH)_2$	
6	$CaO + H_3PO_4 =$ $Ca_3(PO_4)_2 + H_2O$	$3 CaO + 2 H_3PO_4 =$ $Ca_3(PO_4)_2 + 3 H_2O$
7	$NaOH + H_2S = Na_2S + H_2O$	$2 NaOH + H_2S = Na_2S + 2 H_2O$
8	$BaCl_2 + Na_2SO_4 = BaSO_4 \downarrow + NaCl$	$BaCl_2 + Na_2SO_4 = BaSO_4 \downarrow +$ $2NaCl$
9	$CO_2 + H_2O \leftrightarrow H_2CO_3$	

# УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:

## *реакции обмена*

2 ВАРИАНТ		
1	$\text{Fe} + \text{CuCl}_2 = \text{Cu} + \text{FeCl}_2$	
2	$\text{P} + \text{O}_2 = \text{P}_2\text{O}_5$	
3	$\text{Mg} + \text{HCl} = \text{MgCl}_2 + \text{H}_2$	
4	$\text{Al}_2\text{O}_3 + \text{HCl} = \text{AlCl}_3 + \text{H}_2\text{O}$	$\text{Al}_2\text{O}_3 + 6 \text{HCl} = 2 \text{AlCl}_3 + 3 \text{H}_2\text{O}$
5	$\text{P}_2\text{O}_5 + \text{H}_2\text{O} = \text{H}_3\text{PO}_4$	
6	$\text{Ba}(\text{OH})_2 + \text{HNO}_3 =$ $\text{Ba}(\text{NO}_3)_2 + \text{H}_2\text{O}$	$\text{Ba}(\text{OH})_2 + 2 \text{HNO}_3 =$ $\text{Ba}(\text{NO}_3)_2 + 2 \text{H}_2\text{O}$
7	$\text{Ca} + \text{H}_2\text{O} = \text{Ca}(\text{OH})_2 + \text{H}_2$	
8	$\text{AgNO}_3 + \text{KCl} = \text{AgCl} + \text{KNO}_3$	$\text{AgNO}_3 + \text{KCl} = \text{AgCl} + \text{KNO}_3$
9	$\text{Fe}(\text{OH})_3 = \text{Fe}_2\text{O}_3 + \text{H}_2\text{O}$	



**УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:**  
*реакции обмена*

3 ВАРИАНТ		
1	$\text{Cu} + \text{O}_2 = \text{CuO}$	
2	$\text{Fe}_2\text{O}_3 + \text{HCl} = \text{FeCl}_3 + \text{H}_2\text{O}$	$\text{Fe}_2\text{O}_3 + 6 \text{HCl} = 2 \text{FeCl}_3 + 3 \text{H}_2\text{O}$
3	$\text{Ba} + \text{H}_2\text{O} = \text{Ba}(\text{OH})_2 + \text{H}_2$	
4	$\text{SO}_2 + \text{H}_2\text{O} \leftrightarrow \text{H}_2\text{SO}_3$	
5	$\text{CuCl}_2 + \text{KOH} = \text{Cu}(\text{OH})_2 + \text{KCl}$	$\text{CuCl}_2 + 2 \text{KOH} = \text{Cu}(\text{OH})_2 + 2 \text{KCl}$
6	$\text{Ca}(\text{OH})_2 + \text{HNO}_3 =$ $\text{Ca}(\text{NO}_3)_2 + \text{H}_2\text{O}$	$\text{Ca}(\text{OH})_2 + 2 \text{HNO}_3 =$ $\text{Ca}(\text{NO}_3)_2 + 2 \text{H}_2\text{O}$
7	$\text{AgNO}_3 + \text{NaBr} = \text{AgBr} + \text{NaNO}_3$	$\text{AgNO}_3 + \text{NaBr} = \text{AgBr} + \text{NaNO}_3$
8	$\text{Cu} + \text{Hg}(\text{NO}_3)_2 = \text{Cu}(\text{NO}_3)_2 + \text{Hg}$	
9	$\text{Mg} + \text{HCl} = \text{MgCl}_2 + \text{H}_2$	

**УРАВНЕНИЯ ХИМИЧЕСКИХ РЕАКЦИЙ:**  
*реакции обмена*

№	4 ВАРИАНТ	
1	$\text{Na} + \text{H}_2\text{O} = \text{NaOH} + \text{H}_2 \uparrow$	
2	$\text{Zn} + \text{Pb}(\text{NO}_3)_2 = \text{Pb} + \text{Zn}(\text{NO}_3)_2$	
3	$\text{Mg} + \text{H}_2\text{SO}_3 = \text{MgSO}_3 + \text{H}_2 \uparrow$	
4	$\text{H}_2 + \text{O}_2 = \text{H}_2\text{O}$	
5	$\text{Cu}(\text{OH})_2 = \text{CuO} + \text{H}_2\text{O}$	
6	$\text{CaCO}_3 + \text{HCl} =$ $\text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$	$\text{CaCO}_3 + 2 \text{HCl} =$ $\text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$
7	$\text{HBr} + \text{NaOH} = \text{NaBr} + \text{H}_2\text{O}$	$\text{HBr} + \text{NaOH} = \text{NaBr} + \text{H}_2\text{O}$
8	$\text{AgNO}_3 + \text{KI} = \text{AgI} + \text{KNO}_3$	$\text{AgNO}_3 + \text{KI} = \text{AgI} + \text{KNO}_3$
9	$\text{Na}_2\text{O} + \text{H}_2\text{O} = \text{NaOH}$	

Напишите уравнения реакций, расставьте коэффициенты.

1	$\text{Al} + \text{Cl}_2 \rightarrow ?$	$2 \text{Al} + 3 \text{Cl}_2 = 2 \text{AlCl}_3$
2	$\text{KClO}_3 \rightarrow \text{KCl} + \text{O}_2$	$2 \text{KClO}_3 = 2 \text{KCl} + 3 \text{O}_2$
3	$\text{Al} + \text{Fe}_2\text{O}_3 \rightarrow ?$	$2 \text{Al} + \text{Fe}_2\text{O}_3 = \text{Al}_2\text{O}_3 + 2 \text{Fe}$
4	$\text{NO} + \text{O}_2 \rightarrow \text{NO}_2$	$2 \text{NO} + \text{O}_2 = 2 \text{NO}_2$
5	$\text{Na} + \text{Cl}_2 \rightarrow ?$	$2 \text{Na} + \text{Cl}_2 = 2 \text{NaCl}$
6	$\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$	$\text{CH}_4 + 2 \text{O}_2 \rightarrow \text{CO}_2 + 2 \text{H}_2\text{O}$
7	$\text{Al} + \text{S} \rightarrow ?$	$2 \text{Al} + 3 \text{S} = \text{Al}_2\text{S}_3$
8	$\text{P} + \text{O}_2 \rightarrow ?$	$4 \text{P} + 5 \text{O}_2 = 2 \text{P}_2\text{O}_5$
9	$\text{N}_2 + \text{H}_2 \rightarrow \text{NH}_3$	$\text{N}_2 + 3 \text{H}_2 \leftrightarrow 2 \text{NH}_3$
10	$\text{CuO} + \text{C} \rightarrow \text{Cu} + \text{CO}_2$	$2 \text{CuO} + \text{C} = 2 \text{Cu} + \text{CO}_2$