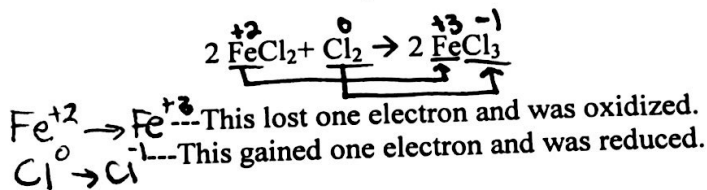


Name: _____

Analyzing Oxidation-Reduction Reactions

When chemical bonds form, electrons are lost, gained or shared. Sometimes elements will lose electrons causing their oxidation states (charge) to go up. This process is called oxidation. Sometimes elements will gain electrons causing their oxidation states (charge) to go down. This is called reduction. It is possible to tell what was oxidized and what was reduced in a chemical reaction by checking the oxidation states of the elements before and after the reaction has taken place. The element that has an increase in oxidation state was oxidized while the one that has a decrease in oxidation state was reduced.

Example:



For each of the examples below, determine the oxidation states of the elements on both sides of the equation. Then determine which element was oxidized and which was reduced. Write your answer in the space provided

Reaction	Element:	
	Oxidized	Reduced
Example: $\overset{0}{\text{Cu}} + 2 \overset{+1}{\text{Ag}}\overset{0}{\text{NO}}_3 \rightarrow \overset{+2}{\text{Cu}}(\overset{0}{\text{NO}}_3)_2 + 2 \overset{0}{\text{Ag}}$ $\text{Cu}^0 \rightarrow \text{Cu}^{+2}$ lost 2e ⁻ , oxidation $\text{Ag}^{+1} \rightarrow \text{Ag}^0$ gained 1e ⁻ , reduction	Cu	Ag
1. $2 \text{Sr} + \text{O}_2 \rightarrow 2 \text{SrO}$		
2. $2 \text{Li} + \text{S} \rightarrow \text{Li}_2\text{S}$		
3. $2 \text{Cs} + \text{Br}_2 \rightarrow 2 \text{CsBr}$		
4. $3 \text{Mg} + \text{N}_2 \rightarrow \text{Mg}_3\text{N}_2$		
5. $4 \text{Fe} + 3 \text{O}_2 \rightarrow 2 \text{Fe}_2\text{O}_3$		

Name: _____

6. $\text{Cl}_2 + 2\text{NaBr} \rightarrow 2\text{NaCl} + \text{Br}_2$		
7. $\text{Si} + 2\text{F}_2 \rightarrow \text{SiF}_4$		
8. $2\text{Ca} + \text{O}_2 \rightarrow 2\text{CaO}$		
9. $\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$		
10. $\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$		
11. $\text{Mg} + \text{Cu}_2\text{SO}_4 \rightarrow \text{MgSO}_4 + \text{Cu}$		
12. $\text{Zn} + \text{Ba}(\text{NO}_3)_2 \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{Ba}$		
13. $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$		
14. $2\text{Fe} + \text{O}_2 \rightarrow 2\text{FeO}$		
15. $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$		

Name: Key

Analyzing Oxidation-Reduction Reactions

When chemical bonds form, electrons are lost, gained or shared. Sometimes elements will lose electrons causing their oxidation states (charge) to go up. This process is called oxidation. Sometimes elements will gain electrons causing their oxidation states (charge) to go down. This is called reduction. It is possible to tell what was oxidized and what was reduced in a chemical reaction by checking the oxidation states of the elements before and after the reaction has taken place. The element that has an increase in oxidation state was oxidized while the one that has a decrease in oxidation state was reduced.

Example:



$\text{Fe}^{+2} \rightarrow \text{Fe}^{+3}$ --- This lost one electron and was oxidized.
 $\text{Cl}^0 \rightarrow \text{Cl}^{-1}$ --- This gained one electron and was reduced.

For each of the examples below, determine the oxidation states of the elements on both sides of the equation. Then determine which element was oxidized and which was reduced. Write your answer in the space provided

Reaction	Element:	
	Oxidized	Reduced
<p>Example: $\text{Cu} + 2 \text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2 \text{Ag}$</p> <p> $\text{Cu}^0 \rightarrow \text{Cu}^{+2}$ (lost 2e-) $\text{Ag}^+ \rightarrow \text{Ag}^0$ (gained 1e-) (N + O stayed the same) </p>	Cu ⁰	Ag ⁺¹
<p>1. $2 \text{Sr} + \text{O}_2 \rightarrow 2 \text{SrO}$</p> <p> $2 \text{Sr}^0 \rightarrow 2 \text{Sr}^{+2}$ (lost 2e- each) $\text{O}_2^0 \rightarrow 2 \text{O}^{-2}$ (gained 2e- each) </p>	Sr ⁰	O ₂ ⁰
<p>2. $2 \text{Li} + \text{S} \rightarrow \text{Li}_2\text{S}$</p>		
<p>3. $2 \text{Cs} + \text{Br}_2 \rightarrow 2 \text{CsBr}$</p> <p> $2 \text{Cs}^0 \rightarrow 2 \text{Cs}^{+1}$ $\text{Br}_2^0 \rightarrow 2 \text{Br}^{-1}$ </p>	Cs ⁰	Br ₂ ⁰
<p>4. $3 \text{Mg} + \text{N}_2 \rightarrow \text{Mg}_3\text{N}_2$</p>		
<p>5. $4 \text{Fe} + 3 \text{O}_2 \rightarrow 2 \text{Fe}_2\text{O}_3$</p> <p> $4 \text{Fe}^0 \rightarrow 4 \text{Fe}^{+3}$ $3 \text{O}_2^0 \rightarrow 6 \text{O}^{-2}$ </p>	Fe ⁰	O ₂ ⁰

Name: _____

6. $\text{Cl}_2 + 2\text{NaBr} \rightarrow 2\text{NaCl} + \text{Br}_2$		
7. $\overset{0}{\text{Si}} + 2\overset{0}{\text{F}}_2 \rightarrow \overset{+4}{\text{Si}}\overset{-1}{\text{F}}_4$ $\text{Si}^0 \rightarrow \text{Si}^{+4} \quad 2\text{F}_2^0 \rightarrow 4\text{F}^{-1}$	Si^0	F_2^0
8. $2\text{Ca} + \text{O}_2 \rightarrow 2\text{CaO}$		
9. $\overset{0}{\text{Mg}} + 2\overset{+1}{\text{H}}\overset{-1}{\text{Cl}} \rightarrow \overset{+2}{\text{Mg}}\overset{-1}{\text{Cl}}_2 + \overset{0}{\text{H}}_2$ $\text{Mg}^0 \rightarrow \text{Mg}^{+2} \quad 2\text{H}^+ \rightarrow \text{H}_2^0$ lost 2e each gained 2e	Mg^0	H^{+1}
10. $\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$		
11. $\overset{0}{\text{Mg}} + \overset{+1}{\text{Cu}}\overset{+6}{\text{S}}\overset{-2}{\text{O}}_4 \rightarrow \overset{+2}{\text{Mg}}\overset{+6}{\text{S}}\overset{-2}{\text{O}}_4 + \overset{0}{\text{Cu}}$ $\text{Mg}^0 \rightarrow \text{Mg}^{+2} \quad 2\text{Cu}^{+1} \rightarrow 2\text{Cu}^0$	Mg^0	Cu^{+1}
12. $\text{Zn} + \text{Ba}(\text{NO}_3)_2 \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{Ba}$		
13. $\overset{0}{\text{H}}_2 + \overset{0}{\text{Cl}}_2 \rightarrow 2\overset{+1}{\text{H}}\overset{-1}{\text{Cl}}$	H_2^0	Cl_2^0
14. $2\overset{0}{\text{Fe}} + \overset{0}{\text{O}}_2 \rightarrow 2\overset{+2}{\text{Fe}}\overset{-2}{\text{O}}$ $2\text{Fe}^0 \rightarrow 2\text{Fe}^{+2} \quad \text{O}_2^0 \rightarrow 2\text{O}^{-2}$ lost 2e each gained 2e each	Fe^0	O_2^0
15. $2\overset{0}{\text{H}}_2 + \overset{0}{\text{O}}_2 \rightarrow 2\overset{+1}{\text{H}}\overset{-2}{\text{O}}$ $2\text{H}_2^0 \rightarrow 4\text{H}^+ \quad \text{O}_2^0 \rightarrow 2\text{O}^{-2}$ lost 1e each each gained 2e	H_2^0	O_2^0