

REACTIONS INVOLVE THE CHEMICAL CHANGE OF ATOMS AND MOLECULES.

Unit 4

Chemical Reactions

Problem Set

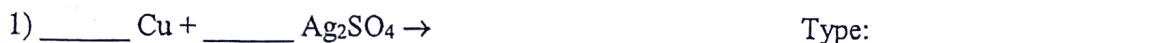
Name _____

Identifying Chemical Reaction Types

For the following reactions, indicate which of the five types they are.



Identify the reaction type, predict the products and balance the following reactions:

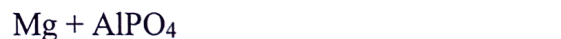



Single Replacement Reactions and the Activity Series

Not all combinations of elements and compounds in single replacement reactions will actually react! You can use the **activity series** of metals to predict this. Follow these two rules:

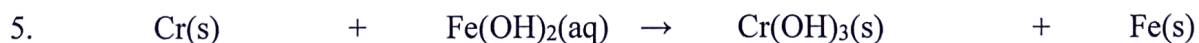
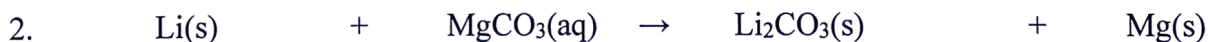
1. *Highly reactive metals prefer to be part of a compound.*
2. *Highly stable metals prefer to be alone.*

Look at the following combinations. If they will react, then predict what the products will be. If they will not react, then write NR for "no reaction".



lithium (Li)		most reactive
potassium (K)		
barium (Ba)		
calcium (Ca)		
sodium (Na)		
magnesium (Mg)		
aluminum (Al)		
zinc (Zn)		
cobalt (Co)		
nickel (Ni)		
lead (Pb)		
copper (Cu)		
silver (Ag)		
gold (Au)		
	least reactive	

Balance each of these single replacement equations.



Write a complete, balanced chemical equation for each single replacement reaction. Include subscripts, and state of matter notation as needed. Don't forget about the diatomic elements! *If no reaction is to occur, write "NR".*

6. Hydrochloric acid is mixed with solid magnesium.
7. Gold metal is placed inside a test tube with phosphoric acid.
8. Solid tin is mixed into a solution of lithium sulfate.
9. Potassium metal is added to a solution of manganese (II) oxide.
10. Sodium is mixed with a solution of cobalt (III) nitrate.
11. A piece of lithium metal is placed in liquid water.
12. A solution of zinc peroxide is added to copper.
13. Lead (II) metal is added to sulfuric acid.
14. A piece of a platinum necklace is swallowed by a dog and enters its stomach (containing HCl).
15. A solution of aluminum phosphide is dripped on a solid piece of calcium.

Name: _____
Hour: _____ Date: _____

Chemistry: Chemical Reaction Practice

Write the correct formula for the compound formed by each of the following pairs of ions. HINT: Remember the criss-cross rule.

1. Na^+ F^- 1. _____
2. K^+ S^{2-} 2. _____
3. Al^{3+} SO_4^{2-} 3. _____
4. Ni^{2+} O^{2-} 4. _____
5. Ca^{2+} ClO_3^- 5. _____

For each of the following compounds, write...

A) the symbols of the ions in the compound (HINT: You might need your polyatomic ion sheet)

B) AND the number of each ion in one molecule of that compound. The first one is done for you!

6. $\text{Fe}_2(\text{SO}_4)_3$ 6. 2 Fe^{3+} and 3 SO_4^{2-}
7. $\text{Mg}(\text{NO}_3)_2$ 7. _____
8. NH_4NO_2 8. _____
9. $\text{KC}_2\text{H}_3\text{O}_2$ 9. _____
10. $\text{Na}_2\text{Cr}_2\text{O}_7$ 10. _____
11. CaI_2 11. _____
12. Na_2CO_3 12. _____
13. $\text{Ga}(\text{ClO}_3)_3$ 13. _____
14. CuF_2 14. _____
15. $(\text{NH}_4)_3\text{PO}_4$ 15. _____

Single Replacement Reactions



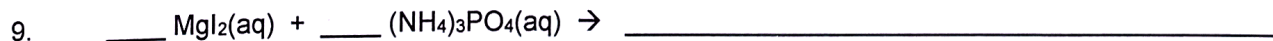
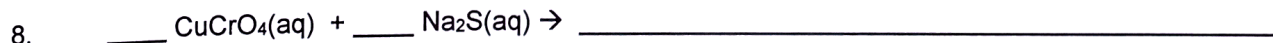
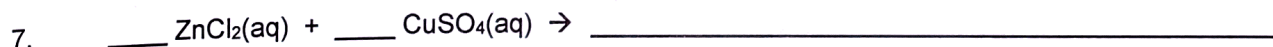
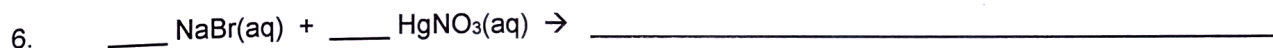
For each single replacement reaction below, determine if the reaction will proceed by using the activity series. If the reaction will NOT occur, write **NR** (no rxn). If the reaction will occur, **predict the products and balance the resulting equation.**

1. _____ Al + _____ HCl → _____
2. _____ F_2 + _____ HBr → _____
3. _____ KI + _____ Fe → _____
4. _____ H_2 + _____ CuNO_3 → _____
5. _____ Sr + _____ CaCO_3 → _____
6. _____ CuF_2 + _____ Cl_2 → _____



Double Replacement Reactions

For each double replacement reaction below, determine if the reaction will proceed by using the solubility table. Remember, for a DR reaction to occur, you usually need to produce a precipitate, a gas, or water. If the reaction will NOT occur, write **NR** (no rxn). If the reaction will occur, predict the products with appropriate phases (i.e. aq, s, l, g) and balance the resulting equation.



Name: _____

Hour: _____ Date: _____

Chemistry: *Chemical Word Equations*

Directions: Write a balanced chemical equation for each of the word equations below.

1. aqueous sodium chloride reacts with aqueous lead (II) nitrate to yield a lead (II) chloride precipitate and aqueous sodium nitrate

2. aqueous barium nitrate reacts with sulfuric acid $[\text{H}_2\text{SO}_4(\text{aq})]$ to yield a barium sulfate precipitate and nitric acid $[\text{HNO}_3(\text{aq})]$

3. silver nitrate reacts in solution with potassium chromate to yield a silver chromate precipitate and soluble potassium nitrate

4. solid calcium carbonate reacts with hydrochloric acid $[\text{HCl}(\text{aq})]$ to yield aqueous calcium chloride, carbon dioxide gas, and liquid water

5. aqueous zinc chloride reacts with dihydrogen monosulfide gas to yield a zinc sulfide precipitate and hydrochloric acid

6. magnesium nitrate reacts in solution with potassium hydroxide to yield a magnesium hydroxide precipitate and soluble potassium nitrate

7. solid aluminum hydroxide reacts with nitric acid to yield soluble aluminum nitrate and liquid water

8. aqueous lead (IV) nitrate reacts with aqueous sodium sulfate to yield a lead (IV) sulfate precipitate and soluble sodium nitrate

9. aqueous sodium hydroxide reacts with carbon dioxide gas to yield soluble sodium carbonate and liquid water

10. solid magnesium oxide reacts with hydrochloric acid to yield a solution of magnesium chloride and liquid water

11. solid zinc metal reacts with sulfuric acid to yield aqueous zinc sulfate and hydrogen gas

12. solid ferric oxide reacts with solid aluminum metal to yield solid aluminum oxide and solid iron metal