

## Chemistry Info Sheet

### Polyatomic Ions

ammonium	$\text{NH}_4^+$
acetate	$\text{C}_2\text{H}_3\text{O}_2^-$
hydroxide	$\text{OH}^-$
hypochlorite	$\text{ClO}^-$
chlorate	$\text{ClO}_3^-$
chlorite	$\text{ClO}_2^-$
nitrate	$\text{NO}_3^-$
nitrite	$\text{NO}_2^-$
permanganate	$\text{MnO}_4^-$
hydrogen sulfate (bisulfate)	$\text{HSO}_4^-$
hydrogen carbonate (bicarbonate)	$\text{HCO}_3^-$
chromate	$\text{CrO}_4^{-2}$
sulfate	$\text{SO}_4^{-2}$
sulfite	$\text{SO}_3^{-2}$
carbonate	$\text{CO}_3^{-2}$
phosphate	$\text{PO}_4^{-3}$

### Acids

Hydrochloric acid	$\text{HCl}$
Nitric acid	$\text{HNO}_3$
Phosphoric acid	$\text{H}_3\text{PO}_4$
Acetic acid	$\text{HC}_2\text{H}_3\text{O}_2$
Carbonic acid	$\text{H}_2\text{CO}_3$
Chloric acid	$\text{HClO}_3$
Sulfuric acid	$\text{H}_2\text{SO}_4$
Sulfurous acid	$\text{H}_2\text{SO}_3$

### Bases

Ammonium hydroxide	$\text{NH}_4\text{OH}$
Sodium hydroxide	$\text{NaOH}$
Calcium hydroxide	$\text{Ca}(\text{OH})_2$

### Greek Prefixes

For use with molecular compounds  
(nonmetal – nonmetal)

Mono – one	Hexa – six
Di – two	Hepta – seven
Tri – three	Octa – eight
Tetra – four	Nona – nine
Penta - five	Deca - ten

### Diatomic Elements

$\text{Br}_2, \text{I}_2, \text{N}_2, \text{Cl}_2, \text{H}_2, \text{O}_2, \text{F}_2$

### Metric Equivalentents

1 km = 1000 m  
 1 m = 100 cm  
 1 m = 1000 mm  
 1 ml = 1 cm<sup>3</sup>  
 1 in = 2.54 cm  
 1 dm<sup>3</sup> = 1 L

### Metals

Group 1	+1	Copper	+1, +2
Group 2	+2	Lead	+2, +4
Group 3	+3	Nickel	+2, +3
Silver	+1	Cobalt	+2, +3
Zinc	+2	Tin	+2, +4
Iron	+2, +3	Cr	+2, +3
Mercury	+1, +2	Mn	+2, +3

### Synthesis Reactions

1. Element + Element yields binary compound
2. Metallic oxide + water yields base (metallic hydroxide)
3. Nonmetallic oxide + water yields acid
4. Metallic oxides and carbon dioxide react to produce metallic carbonates
5. Binary salts and oxygen react to produce a metallic chlorate

### Decomposition Reactions

1. Metallic carbonates form metallic oxides and carbon dioxide when heated
2. Metallic hydroxides form metallic oxides and water
3. Metallic chlorates form metallic chlorides and oxygen when heated
4. Some binary compounds decompose into elements by electric current
5. Some acids form nonmetallic oxides and water
6. Metallic oxides decompose into elements when heated
7. Chlorates break down into a binary salt and oxygen
8. Bases break down to the metallic oxide and water

### Single Replacement Reactions

1. Replacement of a metal in a compound by a more active metal, forming an element and a new compound (salt)
2. Replacement of hydrogen in water by a more active metal, forming a metallic hydroxide and hydrogen
3. Replacement of hydrogen in acid by a more active metal, forming a salt and hydrogen
4. Replacement of halogen (Group VII) by a more active halogen, Forming an element and a compound (salt)

### Double Replacement Reactions (ionic reactions)

A reaction takes place or tends to go to completion if:

- a. One of the products is a gas
- b. An insoluble substance (precipitate) is formed.
- c. One of the products is water
- d. If products are  $\text{H}_2\text{SO}_3$  or  $\text{H}_2\text{CO}_3$  it will continue to decompose into  $\text{H}_2\text{O} + \text{SO}_2$  or  $\text{H}_2\text{O} + \text{CO}_2$

Chlorides, bromides, and iodides: Almost all dissolve, ONLY  $\text{Ag}^{+1}$ ,  $\text{Pb}^{+2}$ , and  $\text{Cu}^{+1}$ ,  $\text{Cu}^{+2}$  precipitate

Sulfates: Most dissolve, only  $\text{Ba}^{+2}$ ,  $\text{Sr}^{+2}$ ,  $\text{Pb}^{+2}$ , and  $\text{Ca}^{+2}$  form precipitates

Sulfides: Almost all form precipitates, ONLY Group 1 and Group 2 Metals, and  $\text{NH}_4^{+1}$  will dissolve

Hydroxides: Almost all form precipitates, ONLY Group 1 metals,  $\text{NH}_4^{+1}$ ,  $\text{Sr}^{+2}$ , and  $\text{Ba}^{+2}$  will dissolve

Phosphates, Carbonates, and Sulfites: Almost all form precipitates, ONLY Group 1 metals and  $\text{NH}_4^{+1}$  will dissolve

Group 1 metal compounds, ammonium salts, nitrates, and acetates: All Dissolve

Chromates: are frequently insoluble.

### Activity Series

#### Metals

Lithium  
Potassium  
Barium  
Calcium  
Sodium  
Magnesium  
Aluminum  
Zinc  
Chromium  
Iron  
Nickel  
Tin  
Lead  
Hydrogen  
Copper  
Mercury  
Silver  
Platinum  
Gold

Decrease  
↓

#### Nonmetals

Fluorine  
Chlorine  
Oxygen  
Bromine  
Iodine  
Sulfur

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