Supplemental Chemical Reactions 5-2

Solubility Rules and Activity of Metals Reference Sheet

Solubility Rules

The following general rules apply to most ionic compounds in water:

1. All inorganic acids and low-molecular weight organic acids are soluble.
2. All alkali metal (Li, Na, K, Rb, and Cs) and ammonium (NH_4^+) compounds are soluble.
3. All acetate, perchlorate, chlorate, and nitrate compounds are soluble.
4. Silver, lead, mercury compounds are insoluble.
5. Chlorides, bromides, and iodides are soluble.
6. Carbonates, hydroxides*, oxides, phosphates, silicates, sulfites, and sulfides* are insoluble.
7. Sulfates are soluble except for calcium, strontium, lead, mercury, silver, and barium.
8. Chromates are insoluble, except for calcium and strontium.

* Exception: Hydroxides and sulfides of Ca, Sr, and Ba are soluble.

These rules are applied in the order they are presented here; that is, a rule higher in the list takes precedence over one lower in the list.

> *For example, $PbSO_4$ is insoluble because rule 4 (which indicates that compounds of lead are insoluble) comes before rule 7 (which indicates that sulfates are soluble with the noted exceptions). Similarly, AgCl is insoluble because rule 4 takes precedence over rule 5.*

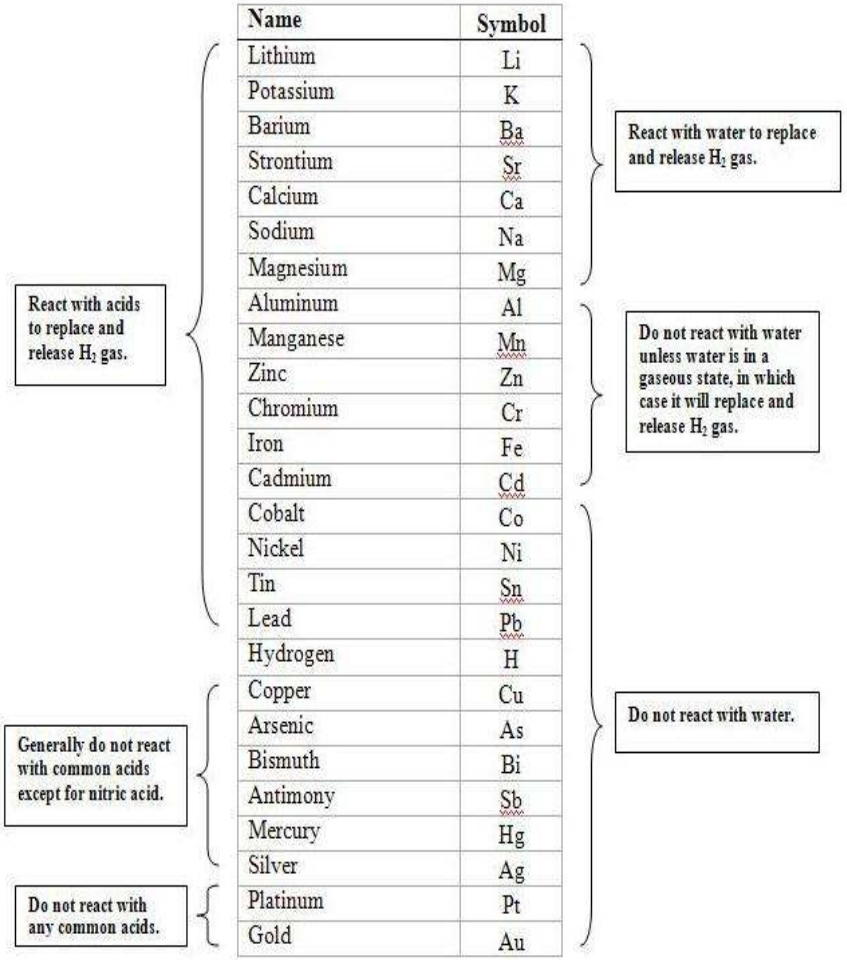
Activity of Nonmetals

*In single replacement reactions, a nonmetal in its **free state** (elemental, unbonded form) will replace any nonmetal below it on the activity series.*

F_2
Cl_2
O_2
Br_2
I_2
S_8
P_4

Activity Series of Metals

*In single replacement reactions, a metal in its **free state** (elemental, unbonded form) will replace any metal below it on the activity series.*



Name	Symbol
Lithium	Li
Potassium	K
Barium	Ba
Strontium	Sr
Calcium	Ca
Sodium	Na
Magnesium	Mg
Aluminum	Al
Manganese	Mn
Zinc	Zn
Chromium	Cr
Iron	Fe
Cadmium	Cd
Cobalt	Co
Nickel	Ni
Tin	Sn
Lead	Pb
Hydrogen	H
Copper	Cu
Arsenic	As
Bismuth	Bi
Antimony	Sb
Mercury	Hg
Silver	Ag
Platinum	Pt
Gold	Au