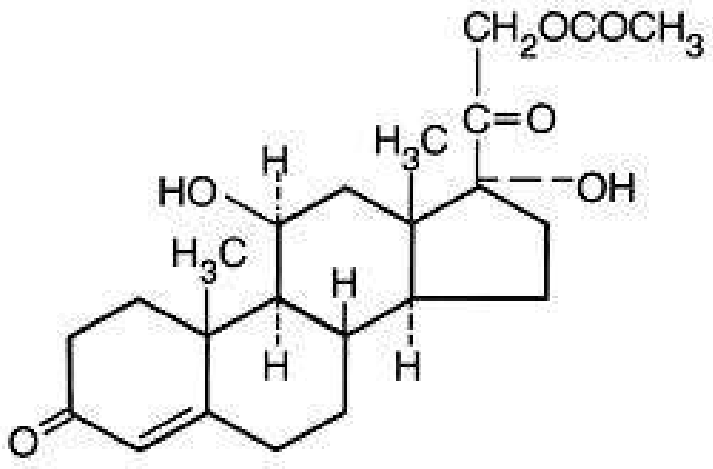
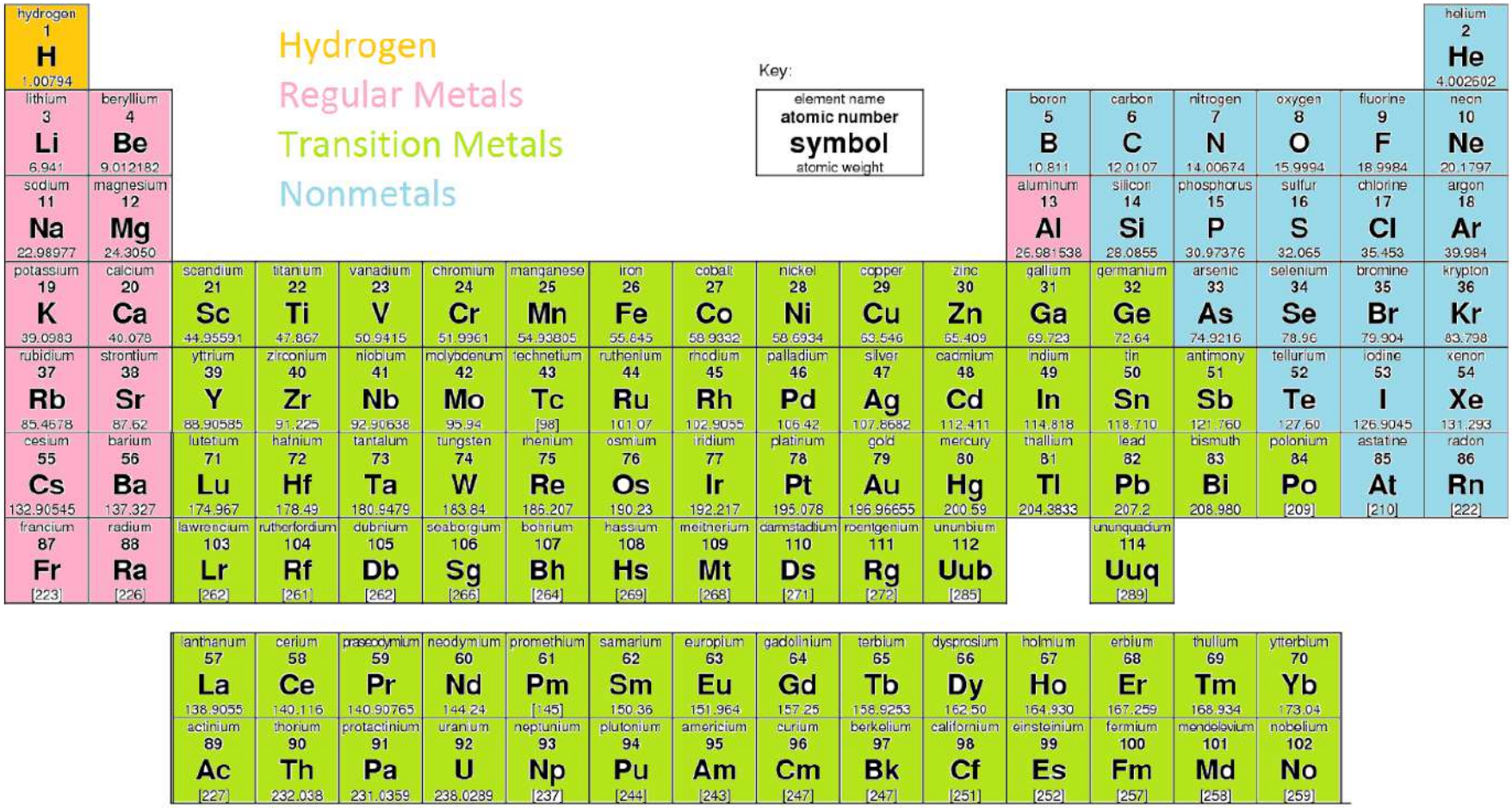
Chapter 9 – Chemical Names and Formulas



Jennie L. Borders

Periodic Table for Naming



Section 9.1 Regular Metals Review

- The regular metals include Group 1 (except H) and 2 and aluminum.
- When naming a compound that starts with a regular metal, name the first element and add –ide to the second element (except for polyatomic ions).
- When writing the formula, remember to balance charges.

Sample Problem

- Write the name or formula for the following:

- $AlBr_3$

  Aluminum bromide

- Sodium sulfate

  Na_2SO_4

Practice Problems

- Write the name or formula for the following:

- $LiNO_3$ Lithium nitrate
- $SrCl_2$ Strontium chloride
- Barium oxide BaO
- Magnesium phosphate $Mg_3(PO_4)_2$

Section 9.2 – Transition Metals Review

- The transition metals are in Groups 3 – 12 and the triangle.
- When naming compounds that start with a transition metal, name the first element, add a roman numeral for the charge, and add –ide to the second element (except for polyatomic ions).
- When writing the formula, remember to balance charges.

Old Names for Transition Metals

- Remember that for the old naming system for transition metals, the –ic ending means the higher charge and the –ous ending means the lower cha

Ion	Old Name
Fe^{3+}	ferric
Fe^{2+}	ferrous
Cu^{2+}	cupric
Cu^{+}	cuprous
Co^{3+}	cobaltic
Co^{2+}	cobaltous
Sn^{4+}	stannic
Sn^{2+}	stannous
Pb^{4+}	plumbic
Pb^{2+}	plumbous
Hg^{2+}	mercuric
Hg_2^{2+}	mercurous

Sample Problem

- Write the name or formula for the following:

- Fe_2O_3

  Iron (III) oxide

- Cupric sulfite

  $CuSO_3$

Practice Problem

- Write the name or formula for the following:

- Zinc (II) permanganate

$Zn(MnO_4)_2$

- Cu_2O (old name)

Cuprous oxide

Section 9.3 – Nonmetals Review

- The nonmetals are located to the right of the stair-step line on the periodic table.
- When naming compounds that start with nonmetals, use prefixes to indicate the number of atoms (except when the first element has 1 atom) and add –ide to the second element.
- When writing the formula do NOT balance charges, use the prefixes to find the subscripts.

Sample Problem

- Write the name and formula for the following:

- N_2O

Dinitrogen monoxide

- Diphosphorus pentoxide

P_2O_5

Practice Problems

- Write the name and formula for the following.

- CO Carbon monoxide

- CCl_4 Carbon tetrachloride

- Nitrogen trihydride NH_3

- Phosphorous trichloride PCl_3

Section 9.4 – Naming and Writing Formulas for Acids and Bases

- An acid is a compound that produces H^+ ions when it dissolves in water.
- The formula for an acid normally starts with and H.
- When naming acids, you should first determine whether or not the acid contains oxygen.

Acids that do not Contain Oxygen

- If the acid does not contain oxygen, then you add the prefix hydro- and suffix is –ic. Also add acid at the end.
- Ex: HCl = **hydro**chlor**ic** acid

Sample Problem

- Write the names of the following acids:

- HF Hydrofluoric acid

- HCN Hydrocyanic acid

Practice Problem

- Write the names for the following acids:

- HBr Hydrobromic acid

- HI Hydroiodic acid

Acids that do contain Oxygen

- When an acid does contain oxygen, you must determine whether its polyatomic ion ends in –ate or –ite.
- If the polyatomic ion ends in –ate, then we change the ending to –ic. Ex: HNO_3 = NO_3^- = nitr**ate** = nitr**ic** acid
- If the polyatomic ion ends in –ite, then we change the ending to –ous. Ex: HNO_2 = NO_2^- = nitr**ite** = nitr**ous** acid

Sample Problems

- Write the names of the following acids:

- H_2SO_4 Sulfuric acid

- H_3PO_4 Phosphoric acid

- H_2SO_3 Sulfurous acid

Practice Problems

- Write the names for the following acids.

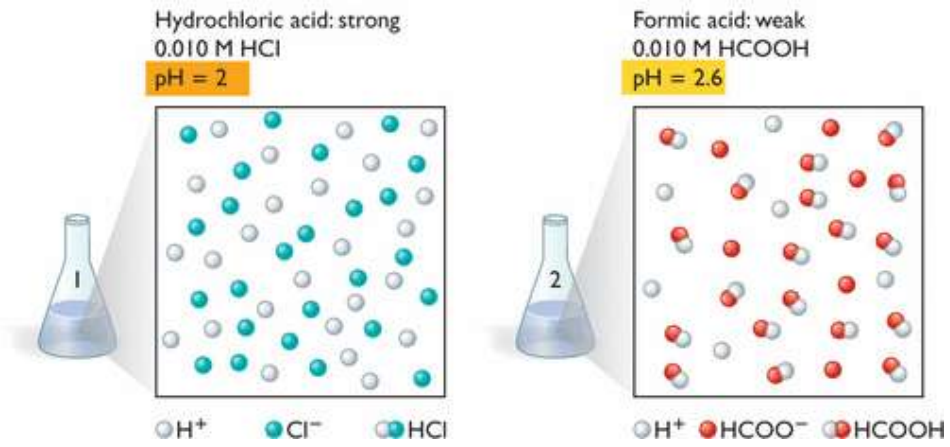
- H_2CO_3 Carbonic acid

- H_3PO_3 Phosphorous acid

- $HClO_2$ Chlorous acid

Writing the Formulas for Acids

- When writing the formula for an acid always start with H even if it is not in the name.
- Remember to balance the charges.
- The ending –ic means that the polyatomic ion ends in –ate.
- The ending –ous means that the polyatomic ion ends in –ite.



Sample Problem

- Write the formula for the following acids.

- Hydrosulfuric acid H_2S

- Hypochorous acid $HClO$

- Acetic acid $HC_2H_3O_2$

Practice Problems

- Write the formula for the following acids.

- Perchloric acid $HClO_4$

- Chromic acid H_2CrO_4

- Oxalic acid $H_2C_2O_4$

Writing the Names and Formulas for Bases

- A base is a compound that produces OH^- in water.
- When naming a base, you name it like any other compound that starts with a regular or transition metal. Ex: NaOH = sodium hydroxide
- When writing the formula for a base, remember to balance charges. Ex: magnesium hydroxide = $Mg(OH)_2$

Section 9.4 Assessment

1. How are the formulas for acids determined?
2. How are bases named?
3. Give the name of $HMnO_4$.
4. Give the names of these bases.
   a. LiOH
   b. $Pb(OH)_2$
   c. $Al(OH)_3$
5. Identify each compound as an acid or a base.
   a. $Ba(OH)_2$
   b. $HClO_4$
   c. KOH

Section 9.4 Assessment

6. Write the formula for the following compounds.
    a. carbonic acid
    b. sulfurous acid
    c. iron (III) hydroxide

THE END