

Naming Compounds

- Goal: Names from formulas; Formulas from names
- Know Tables 2.3 - 2.6 well - Do Homework!
- Learn elemental symbols and names for elements 1-36 and other common elements

1. Binary (contains two elements) ionic compounds

- contain typically a metal cation and a non-metal anion

Two Types

Type I: contains simple monoatomic cation and anion

Rules:

- cation is named first
 - for simple, monoatomic cations, use element name (ex. K^+ = potassium)
- Note: alkali metals (Group IA) form 1^+ cations
alkaline earth metals (Group IIA) form 2^+ cations
- for simple, monoatomic anions, use root of element name + “-ide” (ex. Cl^- = chloride)
- Note: halides (Group VIIA) give 1^- anions
chalcogenides (Group VIA) give 2^- anions

Type II: contains a metal ion that can form more than one kind of cation

- Transition metals can typically form more than one kind of cation (ex. Cu^+ , Cu^{2+} or Fe^{2+} , Fe^{3+})

Rule:

Indicate charge on cation using roman numerals (Stock system)

Examples:

2. Polyatomic Ions

Def: charged cluster of bonded atoms

Ex. NH_4^+ = ammonium

OH^- = hydroxide

PO_4^{3-} = phosphate

CO_3^{2-} = carbonate

a. Oxoanions (or oxyanions)

Def: polyatomic ions containing “O”

Rule:

Stem name plus a prefix and/or suffix denoting relative number of oxygens

Note Trends:

- If two members in a series, use “-ite” suffix for one with fewest # of O atoms and “-ate” suffix for one with the most # of O atoms

Ex. SO_3^{2-} = sulfite

NO_2^- = nitrite

SO_4^{2-} = sulfate

NO_3^- = nitrate

- If more than two in a series, use “hypo-” prefix for fewest number of O atoms and “per-” for most number of O atoms

Ex. ClO^- = hypochlorite

ClO_2^- = chlorite

ClO_3^- = chlorate

ClO_4^- = perchlorate

Examples:

3. Binary Molecular Compounds

- contain typically two nonmetal atoms

Rules:

- first element in formula named first
- name second element like anions
- use prefixes (mono, di, tri, tetra, etc.) to denote #'s of atoms in the molecule

Note: Do not use “mono-” for naming first element

Examples:

4. Hydrates

- contain weakly bound water molecules in its crystals
- named from *anhydrous* compound (previous rules apply here)

Rule:

Name by using Greek prefix for # of water molecules in formula and the word “hydrate” to denote water

Ex. $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ or $\text{Na}_2\text{SO}_4 \text{ X } 10 \text{ H}_2\text{O}$
(sodium sulfate decahydrate)

Examples:

Textbook Learning Aid: NAMING FLOWCHART - FIGURE 2.14