

# Chemical Nomenclature

## Chemistry 101

**Binary ionic compounds:** are formed from the attraction of a metal cation (positive ion) and a non-metal (negative ion). The name of a binary compound consists of the name of the metal from which the cation (positive ion) was formed, followed by the name of the anion (negative ion). We generally ignore subscripts in naming binary ionic compounds.

NaCl Sodium chloride                      CaO Calcium oxide

**Writing formulas for binary ionic compounds:** is a two-step process. The first step is to write down the symbol and charge for each ion in the binary compound. The second step is to use subscripts to balance charge in the compound so that there are as many positive charges as negative charges:

**Example:** Potassium oxide is an ionic compound formed from the  $K^+$  ion and the  $O^{2-}$  ion. In order to produce an ionic compound, there must be the same number of positive charges as negative charges (because all matters are neutral). This accomplished by having two  $K^+$  bonding to the single  $O^{2-}$ . The ionic formula for potassium oxide is therefore  $K_2O$ .

**Ionic compound containing polyatomic ions:** are named similarly to binary compounds, except that the polyatomic ion name is used whenever one is encountered.

CaCO<sub>3</sub> Calcium carbonate  
KNO<sub>3</sub> Potassium nitrate

**Writing formulas for the ionic compounds containing polyatomic ions:** is accomplished in the same manner that is for binary ionic compounds. The difference is that parenthesis must be used with polyatomic ions needing subscripts. For example in  $Ca(NO_3)_2$ , there are two  $NO_3^-$  ions in the compound. Trying to write formula without the parenthesis,  $NO_{32}$ , would suggest that the compound contains 32 oxygen atoms.

**Ionic compound containing transition metals:** Some transition and inner transition elements have more than one possible charge. We show the charge with the Roman numeral following the name of metal (for **Systematic name or IUPAC** (*International Union of Pure and Applied Chemistry*)). Or we use the suffix “-ous” to show the smaller charge and suffix “-ic” to show the larger charge (for **Common name**).

Cu<sub>2</sub>O contains Cu<sup>+</sup>                      Copper(I) oxide                      Cuprous oxide  
CuO contains Cu<sup>2+</sup>                      Copper(II) oxide                      Cupric oxide

**Binary covalent compounds:** the name for a binary covalent compound is obtained by listing the name of the less electronegative element, followed by the more electronegative elemental stem with the ending “-ide”. Greek prefixes (mono-, di-, tri-, tetra-, penta-, hexa-, hepta-, octa-, nona-, deca-) are used to denote the number of atoms for each element. “Mono” is ignored for the first atom.

CCl<sub>4</sub> Carbon tetrachloride                      CO Carbon monoxide

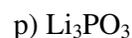
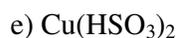
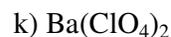
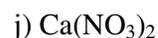
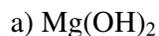
## Problem set # 3

### Chemistry B2A

#### Nomenclature

**Name:**

1. Provide the name for the following compounds:



2. Provide the correct formula for the following compounds:

a) Cesium Chromate

i) Chromium(II) bromide

b) Strontium sulfide

j) Sodium nitrite

c) Calcium chlorite

k) Iron(III) hydroxide

d) Ammonium hydrogen phosphate

l) Aluminum dihydrogen phosphate

e) potassium phosphide

m) Lead(IV) Iodide

f) Cobalt(III) carbonate

n) Beryllium hydrogen carbonate

g) Aluminum fluoride

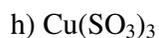
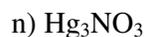
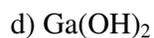
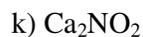
o) Gallium sulfide

h) Beryllium oxide

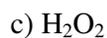
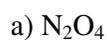
p) Magnesium phosphate

3. Are these formulas correct? Correct them if they are not correct:





4. Provide the name for the following compounds:



5. Provide the correct formula for the following compounds (Notice: these compounds are just for practicing and some of them do not exist):

a) Diselenium dichloride

f) Krypton difluoride

b) Carbon tetrabromide

g) Dinitrogen pentasulfide

c) Diarsenic trisulfide

h) Boron monophosphide

d) Iodine heptafluoride

i) Xenon hexafluoride

e) Dichlorine heptoxide

j) Tetrarsenic decoxide