**Chapter 5 Cheat Sheet: Ionic Compounds**

**Rules for Naming Binary Ionic Compounds:**

1. The full name of the cation is listed first. (A cation is a positive ion).

2. The root of the anion name is listed second and is followed by the suffix

“ide.”(An anion is a negative ion).

3. If the compound contains a transition metal, a Roman numeral is included after

the cation name to indicate the oxidation number of the metal.

4. Remember that the cation(s) and anion(s) combine in the simplest ratio that

balances the charge. That is, the sum of the charge must be equal to zero in the

compound formed.

**Rules for Naming Ionic Compounds Containing**

**Polyatomic Ions:**

1. The full name of the cation is listed first.

2. The full name of the anion is listed second.

3. Use the periodic table of ions for common polyatomic ions

4. Remember that the cation(s) and anion(s) combine in the simplest ratio that

balances the charge. That is, the sum of the charge must be equal to zero in the

compound formed.

5. Finally, use parentheses when the simplest ratio requires more than one

polyatomic ion in the compound formula.

**Roman Numerals**  
A Roman numeral in parentheses, followed by the name of the element, is used for elements that can form more than one positive ion. This is usually seen with metals. You can use [a chart](http://chemistry.about.com/od/electronicstructure/a/Valences-Of-The-Elements.htm) to see the possible valences for the elements.

Fe2+ Iron (II)  
Fe3+ Iron (III)  
Cu+ Copper (I)  
Cu2+ Copper (II)

**-ous and -ic**  
Although Roman numerals are used to denote the ionic charge of cations, it is still common to see and use the endings **-ous** or **-ic**. These endings are added to the Latin name of the element to represent the ions with lesser or greater charge, respectively. The Roman numeral naming convention has wider appeal because many ions have more than two valences.

Fe2+ Ferrous  
Fe3+ Ferric  
Cu+ Cuprous  
Cu2+ Cupric

Sn2+ Stannous

Sn4+ Stannic

**-ide**  
The **-ide** ending is added to the name of a monoatomic ion of an element.

H- Hydride  
F- Fluoride  
O2- Oxide  
S2- Sulfide  
N3- Nitride  
P3- Phosphide

**-ite and -ate**  
Some polyatomic anions contain oxygen. These anions are called **oxyanions**. When an element forms two oxyanions, the one with less oxygen is given a name ending in**-ite** and the one with more oxgyen is given a name that ends in **-ate**.

NO2- Nitrite  
NO3- Nitrate  
SO32- Sulfite  
SO42- Sulfate

**hypo- and per-**  
In the case where there is a series of four oxyanions, the **hypo-** and **per-** prefixes are used in conjunction with the **-ite** and **-ate**suffixes. The **hypo-** and **per-** prefixes indicate less oxygen and more oxygen, respectively. The **per-** prefix is also used when two atoms of oxygen combine with two atoms of a group 1 element.

ClO- Hypochlorite  
ClO2- Chlorite  
ClO3- Chlorate  
ClO4- Perchlorate

H2O2 Hydrogen peroxide

**bi- and di- hydrogen**  
Polyatomic anions sometimes gain one or more H+ ions to form anions of a lower charge. These ions are named by adding the word **hydrogen** or **dihydrogen** in front of the name of the anion. It is still common to see and use the older naming convention in which the prefix **bi-** is used to indicate the addition of a single hydrogen ion.

HCO3- Hydrogen carbonate or bicarbonate  
HSO4- Hydrogen sulfate or bisulfate  
H2PO4- Dihydrogen phosphate