

# NOMENCLATURE FOR SIMPLE INORGANIC COMPOUNDS

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STEPS TO FOLLOW WHEN GIVEN FORMULAS AND ASKED TO NAME THE COMPOUND:

1. Look at the formula to see if it is a binary compound i.e. only 2 elements.
2. If it is a binary compound, check to see which of the following it is:
  - a) Metal + Non-metal
  - b) Transitional metal + Non-metal
  - c) Non-metal + Non-metal

We do this because each of the above has a different system for naming.

## **IF: METAL + NON-METAL**

- Name the metal first
- Name the non-metal, drop the ending of its name and add "ide"

*Example:* NaCl sodium chloride  
Mg F<sub>2</sub> magnesium fluoride

## **IF: TRANSITIONAL METAL + NON-METAL**

- Name the transition metal, follow the name with a Roman numeral showing the number of electrons the TM gave up (you have to calculate the number).
- Name the non-metal, dropping the ending and add "ide"

*Example:* FeO

- To calculate how many electrons Fe gave up. Write each element as many times as indicated by the subscript  
Fe O
- Put the correct charge on the non-metal  
Fe O<sup>-2</sup>
- Now balance the charges (you only have one Fe so the total negative charge will be on that one atom)  
Fe<sup>+2</sup> O<sup>-2</sup>
- now you are ready to name the compound  
Iron (II) oxide

*Example:* Cu<sub>2</sub>S

- Calculate the charge on Cu, you have two atoms this time, so write the symbol twice  
Cu S  
Cu
- Put the charge on the non-metal  
Cu S<sup>-2</sup>
- Balance the charges; distribute the -2 evenly on the two atoms of Cu  
Cu<sup>+1</sup> S<sup>-2</sup>  
Cu<sup>+1</sup>
- Now you are ready to name the compound  
Copper (I) sulfide

Working with transitional metals takes practice so don't panic. Just make sure you go through all the steps and that you write the steps on the paper. It is not always beneficial to do this in your head!

**IF: NON-METAL + NON-METAL**

When we are naming this type of compound we use prefixes to show how many atoms of each element we have in the compound.

1 atom = mono	5 atoms = penta
2 atoms = di	6 atoms = hexa
3 atoms = tri	7 atoms = hepta
4 atoms = tetra	8 atoms = octa

To Name the compound, do the following steps:

- Name the first element in the formula, using the proper prefix according to the subscript.
- Name the second element in the formula, using the proper prefix according to the subscript. Drop the ending and add "ide". The mon is usually only used with Carbon and Oxygen.

<i>Example:</i>	CCl <sub>4</sub>	Carbon <u>tetrachloride</u>
	N <sub>2</sub> O <sub>5</sub>	<u>Dinitrogen pentoxide</u>

By now you should be aware of the importance of being able to tell the difference on the Periodic Table between a metal and a transition metal. Just in case you are still confused here are the groups:

METALS = IA, IIA, IIIA

NON-METALS = IVA, VA, VIA, VIIA

TRANSITION METALS = B GROUP - (Your instructor will tell you which to learn)

**DON'T FORGET ALL BINARY COMPOUNDS END IN "IDE"!!!**

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What about the compound that is NOT BINARY? (Compounds that have three or more elements in them are not binary.) The compounds that we need to worry about are those that contain polyatomic ions – You will need to memorize those ions given to you by your instructor.

To name these: Again count the number of elements in the formula. If there are three or more we are using polyatomic ions.

### **IF: POLYATOMIC ION + NON-METAL**

- Name the ion
- Name the non-metal, drop ending and add "ide"

*Example:*       $\text{NH}_4\text{F}$                   Ammonium fluoride

### **IF: METAL + POLY ATOMIC ION**

- Name the metal
- Name the polyatomic ion (drop the word ion)

*Example:*       $\text{Ca}(\text{NO}_3)_2$                   Calcium nitrate  
                     $\text{K}_2\text{SO}_4$                           Potassium sulfate

### **IF: TRANSITION METAL + POLY ATOMIC ION**

- Name the TM, follow it by a Roman numeral showing charge
- Name the polyatomic ion

*Example:*       $\text{CuSO}_4$                                   Cu                                   $\text{SO}_4^{-2}$   
                    Balance: Change charge                   $\text{Cu}^{+2}$                                    $\text{SO}_4^{-2}$   
                    Now name the compound:                  Copper (II) sulfate

*Example:*       $\text{Ni}(\text{NO}_3)_2$                                   Ni                                   $\text{NO}_3^{-1}$   
                    Balance charges                                   $\text{Ni}^{+2}$                                    $\text{NO}_3^{-1}$   
                    Now name the compound:                  Nickel (II) nitrate

### **IF: POLY ATOMIC ION + POLY ATOMIC ION**

- Name the first polyatomic ion
- Name the second polyatomic ion

You will not be able to name compounds using polyatomic ions until you have memorized the list of the polyatomic ions given to you by your instructor or that appear in your book. Using flash cards is a great way to learn them!