**Science 10: Names and Formulas for Ionic Compounds**

Name:

Date:

*The International Union of Pure and Applied Chemistry (IUPAC) is an organization that represents chemists from around the world and develops rules for naming compounds.*



Ionic Compounds are composed of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (a metal and a non-metal). They can be described using a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.



**Naming Ionic Compounds**

You can determine the name of an ionic compound containing two elements by analyzing its formula.

Rules

#1 – The positive metal ion is ALWAYS written first

#2 – The negative non-metal ion is ALWAYS written second

#3 – The non-metal ends with the suffix ‘ide’



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| --- | --- | --- |
| **Steps** | **Examples** | |
| **CaI2** | **Na3P** |
| 1. Name the metal ion |  |  |
| 1. Name the non-metal ion by ending the element with the suffix ‘ide’ |  |  |
| 1. Write the name of the compound |  |  |

*Your Turn ☺ - Write the names for the compounds*



1. Li3N B) MgBr2



1. RbF D) AgI



**Writing the formula for Ionic Compounds**

Rules

#1 – positive and negative charges balance

#2 – final formula represents the smallest whole number ratio

**Example:** *aluminum fluoride*



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| --- | --- |
| **Step 1:** Identify each ion and its charge |  |
| **Step 2:** Determine the total charges needed to balance positive with negative |  |
| **Step 3:** Note the ratio of positive ions to negative ions |  |
| **Step 4:** Use subscripts to write the formula. A “1” is not shown in the subscripts. |  |

**Example:** *magnesium nitride*

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| --- | --- |
| **Step 1:** Identify each ion and its charge |  |
| **Step 2:** Determine the total charges needed to balance positive with negative |  |
| **Step 3:** Note the ratio of positive ions to negative ions |  |
| **Step 4:** Use subscripts to write the formula. A “1” is not shown in the subscripts. |  |



Your turn ☺ - Write the formulas of the compound containing the following ions

1. Na+ and Br-



1. Zn2+ and I-



1. K+ and S2-



Your turn ☺ - Write the formulas of the following ionic compounds

1. strontium nitride



1. lithium oxide



1. silver sulphide



**Writing formulas and names for compounds containing multivalent metals**



Multivalent metals can form two or more different positive ions with different ion charges.



For example, find nickel on the periodic table. List its possible ion charges.



This means that nickel is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. In some compounds, the nickel ion is Ni2+ and in others it is Ni3+. Whichever ion is listed first is more common.



When writing names of multivalent metals, use a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to identify its ion charge.



*Writing a formula for ionic compounds with multivalent metals*

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| **Steps** | **Examples** | |
| manganese(IV) sulphide | cobalt(III) oxide |
| 1. Identify each ion and its charge |  |  |
| 1. Determine the total charges needed to balance positive with negative |  |  |
| 1. Note the ratio of positive ions to negative ions |  |  |
| 1. Use subscripts to write the formula. A “1” is not show in the subscripts |  |  |

Your turn ☺ - Write the formulas of the following compounds containing multivalent metals

(a) copper(I) nitride (b) iron(II) phosphide



(c) manganese(II) oxide (d) manganese(IV) oxide



*Naming compounds that contain a Multivalent Metal*

|  |  |  |
| --- | --- | --- |
| **Steps** | **Examples** | |
| Au3N | PdS2 |
| 1. Identify the metal |  |  |
| 1. Verify that it can form more than one kind of ion by checking the periodic table |  |  |
| 1. Determine the ratio of the ions in the formula |  |  |
| 1. Note the change of the negative ion from the periodic table |  |  |
| 1. The positive and negative charges must balance out. Determine what the charge needs to be on the metal ion to balance the negative ion |  |  |
| 1. Write the name of the compound |  |  |

Your turn ☺ - Write the names of the following compounds (they all contain multivalent metals)



(a) Fe2O3 (b)PbF4



(c) FeI2 (d) HgI2

