

Lesson 7: Naming Ionic Compounds

Notes:

Rules:

1. Write the full name of the metal first. Non-metal exceptions that are written first are when they are positive ions (i.e., cations) such as ammonium (NH_4^+) or hydrogen (H^+).
2. If the metal can have more than one charge (i.e, it is multivalent), we use a roman numeral.
3. Non-metals are named second. Simple ions always end in “ide”. For polyatomic ions look at your ion sheet provided. (**NOTE:** Some of the negatively charged ions (i.e., anions) have more than one name possible.)

e.g., The non-metal oxygen would be written as **oxide** in an ionic naming system.

Practice Exercises:

1. CaO -----→ calcium oxide

(Note: a roman numeral is not used because calcium only has one charge possible.)

Q: How do I know when a metal cation is multivalent?

A: Check your periodic table! Multivalent metals tend to occur in the transition block of elements (i.e., group 3-12) **AND** under the semimetal line (the staircase).

2. Na_2O -----→ sodium oxide

3. K_3P -----→ potassium phosphide

4. $\text{Ca}(\text{OH})_2$ -----→ calcium hydroxide

(Note: because OH^- is a complex ion, we use the ion sheet to determine the naming rule)

5. Li_2SO_4 -----→ lithium sulfate

Orally:

Q: How do I know that I have SO_4^{2-} and not 4 groups of SO?

A: If you had 4 groups of SO you would have brackets around the SO (you don't!)

6. FeSO_4 -----→ iron (II) sulfate

(Note: A roman numeral must be used because iron is a multivalent metal ion.)

Orally:

Q: How did I know to use Fe^{+2} and not Fe^{+3} ?

A: Try writing the formula between both iron ions and sulfate. Only one combination works.

Q: What is the formula if Fe^{+3} and SO_4^{-2} is used?

A: $\text{Fe}_2(\text{SO}_4)_3$. This is clearly not the answer we are looking for.

7. SnO -----→ Tin (II) oxide

8. SnO_2 -----→ Tin (IV) oxide

Orally:

Q: How is the cation Sn^{+4} part of the correct answer?

A: After crossing over charges, the subscripts need to be reduced. (show this)

9. $\text{Mn}_2(\text{CrO}_4)_7$ -----→ manganese (VII) chromate

Orally:

Q: How did we determine the charge on the metal to be +7? This is not even one of the choices on the ion sheet!

A: +7 is the only charge that will yield 7 groups of Chromate when crossing-over occurs. Since Chromate can only have a -2 charge, we can deduce the charge on Mn.

10. $\text{Ni}(\text{ClO})_2$ -----→ nickel (II) hypochlorite

Assignment: Worksheet on Writing Ionic names.