

Naming Molecular Compounds including Acids

In the previous NS's you learned a whole set of rules for naming ionic compounds – those compounds made of metals with nonmetals.

There are different rules used to name *molecular* compounds – the compounds made of only nonmetals.

- Since molecular formulas do not contain ions, and can combine in such a wide variety of ratios (compared to ionic compounds), a different method of determining the subscripts must be used.

First it is critical that you can identify a compound as being ionic or molecular.

- When faced with naming or writing compounds it is important to first identify if the compound is ionic or molecular. Having done that, you can use the NS 4.2, 4.3, and 4.4 for writing and naming ionic compounds (Type I, II, and polyatomics, and this NS 4.5 for writing and naming binary molecular compounds (Type III).

Method of Naming Binary Molecular Compounds

The term binary means – involving two elements. Thus a molecular compound is made of two (only two, and not three) different nonmetals. We will not learn any systematic method of naming molecular compounds with more than two different elements. Instead, we will refer to them by their common names, like sugar $C_6H_{12}O_6$

The first element listed retains the same name, and the second element changes its ending into ____ - ide

There is no need to consider any charge since when nonmetals bond with other nonmetals, electrons are shared, and no ions are formed. Instead, prefixes are used to indicate the subscript attached to the element.

- | | | | |
|-----|--------|------|--------|
| • 1 | mono- | • 5 | penta- |
| • 2 | di- | • 6 | hexa- |
| • 3 | tri- | • 7 | hepta- |
| • 4 | tetra- | • 8 | octo- |
| | | • 9 | nono- |
| | | • 10 | deca- |
- ➔ this prefix may or may not be used for the second element (and not usually used for the first element)

For example

carbon <u>mon</u> oxide	CO
<u>d</u> initrogen sulfide	N ₂ S
carbon <u>di</u> oxide	CO ₂
<u>di</u> sulfur <u>pent</u> oxide	S ₂ O ₅

- You can see that sometimes the mono- is used for the second element, and other times not,
- (carbon monoxide and dinitrogen sulfide) you can choose which you prefer.
- You can see that the prefixes are sometimes modified to make the name smoother. (mono oxide = monoxide)

Acids (Compounds that sit the fence between ionic and covalent)

Acids are compounds that are molecular in make-up (made of nonmetals with covalent bonds), but when put into water, they separate into ions, thus behaving like ionic compounds. There are several acids for which you should memorize the chemical formula:

Most Importantly (memorize or learn the scheme for naming acids – check out page 2)

HCl hydrochloric acid

H₂SO₄ sulfuric acid

HNO₃ nitric acid

Second Most Important (memorize, or learn the scheme, if you want to get bonus points)

HC₂H₃O₂ (or CH₃COOH) acetic acid

H₃PO₄ phosphoric acid

H₂CO₃ carbonic acid

Naming Molecular Compounds including Acids

