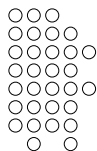


NOMENCLATURE

Writing and Naming Chemical Formulas

from L. *nomenclatura* "calling of names," from *nomenclator* "namer," from *nomen* "name" + *calator* "caller, crier,"

Nomenclator in Rome was the title of a steward whose job was to announce visitors, and also of a prompter who helped a stumping politician recall names and pet causes of his constituents. Meaning "list or catalogue of names" first attested 1635; that of "system of naming" is from 1664; sense of "terminology of a science" is from 1789.



Chemical Formulas



The subscript to the right of the symbol of an element tells the number of atoms of that element in one molecule of the compound.



Molecular Compounds



Molecular compounds are composed of molecules and almost always contain only nonmetals.



Types of Formulas



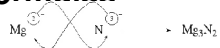
- Empirical formulas give the lowest whole-number ratio of atoms of each element in a compound.
- Molecular formulas give the exact number of atoms of each element in a compound.

Types of Formulas



- Structural formulas show the order in which atoms are bonded.
- Perspective drawings also show the three-dimensional array of atoms in a compound.

Writing Formulas



- Because compounds are electrically neutral, you determine the formula this way:
 - The charge on the cation becomes the subscript on the anion.
 - The charge on the anion becomes the subscript on the cation.
 - If these subscripts are not in the lowest whole-number ratio, divide them by the greatest common factor.

Representing Chemical Compounds



- OBJECTIVES:

- Distinguish among chemical formulas, molecular formulas, and formula units.

Representing Chemical Compounds



- OBJECTIVES:

- Use experimental data to show that a compound obeys the law of definite proportions.

Chemical Formulas



- Shows the kind and number of atoms in the smallest piece of a substance.
- Molecular formula- number and kinds of atoms in a molecule.
- CO_2
- $\text{C}_6\text{H}_{12}\text{O}_6$

DIATOMS



- There are 7 diatomic elements
- Iodine (I_2), Bromine (Br_2), Chlorine (Cl_2), Fluorine (F_2), Oxygen (O_2), Nitrogen (N_2), and Hydrogen (H_2)
- Remember: "At-F O N Home"

Ionic Compounds



- This formula represents not a molecule, but a formula unit
- The smallest whole number ratio of atoms in an ionic compound.
- Ions surround each other so you can't say which is hooked to which. (p. 140)

LAW OF DEFINITE PROPORTION:



- 1. Law of Definite Proportions- in a sample of a chemical compound, the masses of the elements are always in the same proportions.
- H_2O (water) and H_2O_2 (hydrogen peroxide)

LAW OF MULTIPLE PROPORTION



- Dalton stated that whenever two elements form more than one compound, the different masses of one element that combine with the same mass of the other element are in the ratio of small whole numbers.

Ionic Charges

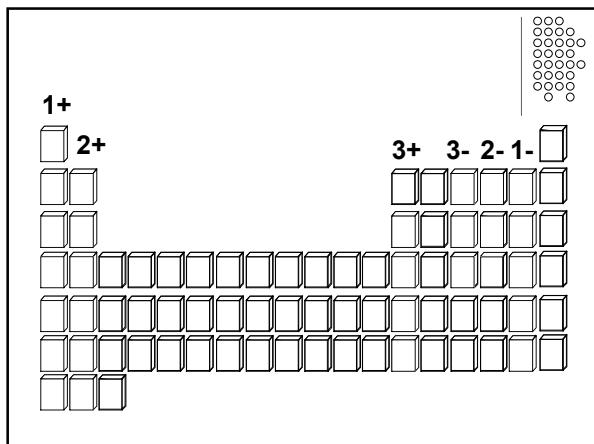


- OBJECTIVES:
 - Use the periodic table to determine the charge on an ion.

Charges on ions



- For most of the Group 1 elements, the Periodic Table can tell what kind of ion they will form from their location; monatomic ions
- Elements in the same group have similar properties.
- Including the charge when they are ions.



What about the others?

- Groups 14 and 18 do not usually form ions (in fact, Group 18 rarely forms compounds!)
- Many transition metals have more than one common ionic charge
