

Chemical Bonds & Equations

Section 2: Writing Formulas & Naming Compounds

A **binary compound** is a compound made of only two different elements. When atoms combine to form compounds, they gain, lose, or share electrons. The oxidation number, which can be positive or negative, shows how many electrons an atom has gained, lost, or shared during bonding. In ionic compounds, the oxidation number is the same as the charge of the ion. Because compounds are electrically neutral overall, the total positive and negative charges in a compound must balance to equal zero. Not all ions are made of single atoms. Some are groups of atoms bonded together that carry an overall charge. These are called polyatomic ions. The prefix “poly-” means “many,” so a **polyatomic ion** contains many atoms acting as one charged unit. Another type of compound, called a **hydrate**, contains water molecules chemically attached to its ions. In chemical formulas, the water molecules are included as part of the compound's structure.

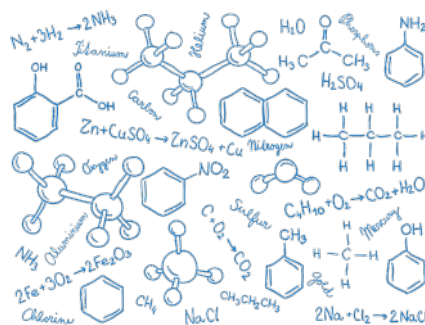
While ionic compounds form through the transfer of electrons, covalent compounds form when atoms share electrons. Covalent compounds can combine in different ratios, allowing the same elements to form multiple compounds. To show the number of atoms in covalent compounds, scientists use Greek prefixes such as mono-, di-, tri-, and tetra-. For example, CO is named carbon monoxide, while CO₂ is named carbon dioxide.

Writing Formulas:

Step 1: Write the symbol of the element of the polyatomic ion that has the positive oxidation number (hydrogen, ammonium ion [NH₄⁺], and all metals).

Step 2: Write the symbol of the element of the polyatomic ion with the negative oxidation number (nonmetals and polyatomic ions other than NH₄⁺).

Step 3: Add subscripts so that the sum of the oxidation numbers of all atoms in the formula is zero – use the crisscross method: the charge (without the sign) of one ion becomes the subscript of the other ion.



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Section 2: Writing Formulas & Naming Compounds Cont.

Naming Compounds:

Step 1: Write the name of the first element. *Note: subscripts do not become part of the name for ionic compounds but are used to determine prefixes when naming covalent compounds.

Step 2: Write the root of the name of the second element. Ex. Chlorine's root is chlor-, oxygen's root is ox-, bromine's root is brom-

Step 3: Add the ending -ide to the root. Examples: (Ionic) BaF_2 - Barium Fluoride, AlCl_3 - Aluminum Chloride; (Covalent) N_2O - dinitrogen monoxide, CO - carbon monoxide.

Review:

1. What is a binary compound?
2. What is a hydrate?
3. Explain how to write a chemical formula.