

Key for Naming Simple Inorganic Compounds

Worksheet

Shown below are two sets of simple inorganic compounds. With the exception of the first entry—which is an atom—the entries in Set 1 are simple covalent molecules. The entries in Set 2 are simple ionic compounds. Examine their formulas and their names and develop a set of rules that you can use to name covalent and ionic compounds.

Set 1	Set 2
N: atomic nitrogen	FeCl ₂ : iron(II) chloride
N ₂ : molecular nitrogen	FeCl ₃ : iron(III) chloride
NO: nitrogen monoxide	ZnCl ₂ : zinc chloride
NO ₂ : nitrogen dioxide	Fe ₂ (SO ₄) ₃ : iron(III) sulfate
N ₂ O: dinitrogen monoxide	FeO: iron(II) oxide
N ₂ O ₅ : dinitrogen pentoxide	Fe ₂ O ₃ : iron(III) oxide
S ₄ N ₃ : tetrasulfur trinitride	Fe ₃ O ₄ : iron(II, III) oxide
Cl ₂ O: dichlorine monoxide	KClO ₄ : potassium perchlorate
PO ₃ : phosphorous trioxide	NaClO ₃ : sodium chlorate
Cl ₂ O ₇ : dichlorine heptoxide	Fe(ClO ₂) ₂ : iron(II) chlorite
SF ₆ : sulfur hexafluoride	Fe(ClO) ₃ : iron(III) hypochlorite
NH ₃ : ammonia	NH ₄ Cl: ammonium chloride

Here are some simple rules for naming covalent compounds:

- use a prefix to indicate the number of each element in the compound, but omit the prefix for the first element if there is just one
- use the name of the first element; for the second element, remove its ending and replace it with a suffix of -ide
- for a single element, use atomic or molecular to distinguish between the atom and the molecule
- common names are often used in place of formal name

Here are some simple rules for naming ionic compounds

- name in order of cation:anion
- metallic cation uses the element's name
- include a Roman numeral to indicate the metal's charge if more than one charge is possible
- numerical prefixes are not needed because overall charge of 0 makes composition clear
- polyatomic ions have names that convey information
 - per-ate has more oxygen than -ate, which has more oxygen than -ite, which has more oxygen than hypo-ite
 - numerical prefixes in polyatomic ions used to give number of hydrogens