

Naming Inorganic Compounds

To name a compound you must first decide whether the substance is an ionic or molecular compound. *Ionic compounds* are easily recognized since they usually contain *both* metallic and non-metallic elements. The most common exception to this rule are ionic compounds containing the ammonium ion, NH_4^+ , such as $(\text{NH}_4)_2\text{CO}_3$ or NH_4Br which contain no metal ions. *Molecular compounds* typically contain *only non-metallic atoms* (and metalloids).

Conventions for naming ionic compounds are given in Chang, pp. 59-62. To successfully follow the rules, however, *you must be first learn the names of common ions* (Chang, Tables 2.2 and 2.3, p. 60). Names of ionic compounds do *not* give the *number* of each type of ion in the formula; the chemist is supposed to be able to figure that out from his/her knowledge of ion charges and the requirement that salts be neutral (and thus have a sum of zero for the ion charges in the formula).

Binary compounds of the non-metals are named following the guidelines given in Chang on pp. 62-64. *Note that when naming these molecular compounds, the number of atoms of a given type is commonly indicated with a prefix (di-, tri-, tetra, etc.).*

Exercises

1. Complete the following chart of corresponding ion names and formulas.

Cation Name	Formula	Anion Name	Formula
(1) potassium ion		(11) nitrate ion	
(2)	Fe^{3+}	(12)	H_2PO_4^-
(3) ammonium ion		(13) hydrogen carbonate (or bicarbonate) ion	
(4)	Ba^{2+}	(14)	MnO_4^-
(5) silver ion		(15) perchlorate ion	
(6)	Cu^{2+}	(16)	S^{2-}
(7) zinc ion		(17) acetate ion	
(8)	Co^{2+}	(18) dichromate ion	
(9) hydrogen ion		(19)	CO_3^{2-}
(10) chromium(III) ion		(20) sulfite ion	

2. Complete the following chart of corresponding compound names and formulas. Circle the names of all non-ionic (i.e., molecular) compounds.

Compound Name	Formula	Compound Name	Formula
(1) silver nitrate		(11) sodium hydrogen phosphate	
(2)	$\text{Ni}(\text{CH}_3\text{CO}_2)_2$	(12)	SO_3
(3) ammonium sulfate		(13) potassium permanganate	
(4)	P_2O_5	(14)	Al_2S_3
(5) sodium oxide		(15) cobalt(III) sulfate	
(6)	NH_4NO_3	(16)	Ag_2CrO_4
(7) nitrogen trichloride		(17)	SrF_2