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 $(NH_4)_2CO_3$ 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	

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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)	$Ni(CH_3CO_2)_2$		(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