

Group	No. of Electrons in Atom	Charge of Ion Formed	Examples
1	1 more than noble-gas atom	+1	Na ⁺ , K ⁺
2	2 more than noble-gas atom	+2	Mg ²⁺ , Ca ²⁺
16	2 less than noble-gas atom	-2	O ²⁻ , S ²⁻
17	1 less than noble-gas atom	-1	F ⁻ , Cl ⁻

TABLE 2.2 Some Common Polyatomic Ions

+1	-1	-2	-3
NH ₄ ⁺ (ammonium)	OH ⁻ (hydroxide)	CO ₃ ²⁻ (carbonate)	PO ₄ ³⁻ (phosphate)
Hg ₂ ²⁺ (mercury I)	NO ₃ ⁻ (nitrate)	SO ₄ ²⁻ (sulfate)	
	ClO ₃ ⁻ (chlorate)	CrO ₄ ²⁻ (chromate)	
	ClO ₄ ⁻ (perchlorate)	Cr ₂ O ₇ ²⁻ (dichromate)	
	CN ⁻ (cyanide)	HPO ₄ ²⁻ (hydrogen phosphate)	
	C ₂ H ₃ O ₂ ⁻ (acetate)		
	MnO ₄ ⁻ (permanganate)		
	HCO ₃ ⁻ (hydrogen carbonate)		
	H ₂ PO ₄ ⁻ (dihydrogen phosphate)		

Monatomic anions are named by adding the suffix *-ide* to the stem of the name of the nonmetal from which they are derived.

				H ⁻	hydride
N ³⁻	nitride	O ²⁻	oxide	F ⁻	fluoride
		S ²⁻	sulfide	Cl ⁻	chloride
		Se ²⁻	selenide	Br ⁻	bromide
		Te ²⁻	telluride	I ⁻	iodide

TABLE 2.3 Oxoanions of Nitrogen, Sulfur, and Chlorine

Nitrogen	Sulfur	Chlorine
		ClO_4^- perchlorate
NO_3^- nitrate	SO_4^{2-} sulfate	ClO_3^- chlorate
NO_2^- nitrite	SO_3^{2-} sulfite	ClO_2^- chlorite
		ClO^- hypochlorite

TABLE 2.4 Greek Prefixes Used in Nomenclature

Number*	Prefix	Number	Prefix	Number	Prefix
2	di	5	penta	8	octa
3	tri	6	hexa	9	nona
4	tetra	7	hepta	10	deca

*The prefix mono (1) is seldom used.

Many of the best-known binary compounds of the nonmetals have acquired common names. These are widely—and in some cases exclusively—used. Examples include

H_2O	water	PH_3	phosphine
H_2O_2	hydrogen peroxide	AsH_3	arsine
NH_3	ammonia	NO	nitric oxide
N_2H_4	hydrazine	N_2O	nitrous oxide
C_2H_2	acetylene	CH_4	methane

Pure Substance		Water Solution	
$\text{HCl}(g)$	Hydrogen chloride	$\text{H}^+(aq), \text{Cl}^-(aq)$	Hydrochloric acid
$\text{HBr}(g)$	Hydrogen bromide	$\text{H}^+(aq), \text{Br}^-(aq)$	Hydrobromic acid
$\text{HI}(g)$	Hydrogen iodide	$\text{H}^+(aq), \text{I}^-(aq)$	Hydriodic acid

Most acids contain oxygen in addition to hydrogen atoms. Such species are referred to as *oxoacids*. Two oxoacids that you are likely to encounter in the general chemistry laboratory are



The names of oxoacids are simply related to those of the corresponding oxoanions. The *-ate* suffix of the anion is replaced by *-ic* in the acid. In a similar way, the suffix *-ite* is replaced by the suffix *-ous*. The prefixes *per-* and *hypo-* found in the name of the anion are retained in the name of the acid.

ClO_4^-	perchlorate ion	HClO_4	perchloric acid
ClO_3^-	chlorate ion	HClO_3	chloric acid
ClO_2^-	chlorite ion	HClO_2	chlorous acid
ClO^-	hypochlorite ion	HClO	hypochlorous acid