

Chemical Nomenclature

Polyatomic Ions & Their Rules

Start by memorizing the six “-ate” polyatomic ions shaded in below. They set the pattern for the polyatomic ions formed by elements beneath them in the periodic table.

BO_3^{3-} borate	CO_3^{2-} carbonate	NO_3^- nitrate		
		PO_4^{3-} phosphate	SO_4^{2-} sulfate	ClO_3^- chlorate
		AsO_4^{3-} arsenate	SeO_4^{2-} selenate	BrO_3^- bromate
				IO_3^- iodate

Naming Oxyanions

Once you know the “-ate” ions you can figure out the rest by adding or removing oxygen atoms.

↑ # of O Atoms	+1 O atom	per-	root	-ate
	--		root	-ate
	-1 O atom		root	-ite
	-2 O atom	hypo-	root	-ite

Odds & Ends

Memorize the extra ones below that don't follow the above patterns.

Cation	Anions	Anions
NH_4^+ ammonium ion	$\text{C}_2\text{H}_3\text{O}_2^-$ acetate ion	OH^- hydroxide ion
H_3O^+ hydronium ion	HCO_3^- bicarbonate ion	$\text{C}_2\text{O}_4^{2-}$ oxalate ion
	CrO_4^{2-} chromate ion	MnO_4^- permanganate ion
	CN^- cyanide ion	O_2^{2-} peroxide ion
	$\text{Cr}_2\text{O}_7^{2-}$ dichromate ion	$\text{S}_2\text{O}_3^{2-}$ thiosulfate ion

Greek Prefixes

When naming molecular compounds (those composed of two nonmetals), we use the appropriate Greek prefix and change the ending of the second nonmetal to “-ide”.

Number	Prefix	Number	Prefix
1	mono- (don't use with 1 st nonmetal)	6	hexa-
2	di-	7	hepta-
3	tri-	8	octa-
4	tetra-	9	nona-
5	penta-	10	deca-

The preferred form of monooxide is “monoxide”.

Naming Acids

Acid formulas always begin with H and end with (aq) meaning they are in aqueous solution (dissolved in water). Acids are basically anions combined with one or more H⁺ ions. Figure out the name of the anion to name the acid, or vice-versa.

Anion Ending	Acid Name
<i>root-ide</i>	hydro- <i>root</i> -ic acid
<i>root-ate</i>	<i>root</i> -ic acid
<i>root-ite</i>	<i>root</i> -ous acid