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Common Polyatomic Ions – Organized by Naming Patterns

Ion Name	Formula	Ion Name	Formula
ammonium	NH_4^+	nitrite	NO_2^-
hydronium	H_3O^+	nitrate	NO_3^-
		hydroxide	OH^-
bromite	BrO_2^-	oxide	O^{2-}
bromate	BrO_3^-	peroxide	O_2^{2-}
carbonate	CO_3^{2-}	phosphite	PO_3^{3-}
hydrogen carbonate	HCO_3^-	phosphate	PO_4^{3-}
hypochlorite	ClO^-	hydrogen phosphate	HPO_4^{2-}
chlorite	ClO_2^-	dihydrogen phosphate	$H_2PO_4^-$
chlorate	ClO_3^-	sulfite	SO_3^{2-}
perchlorate	ClO_4^-	sulfate	SO_4^{2-}
chromate	CrO_4^{2-}	hydrogen sulfate	HSO_4^-
dichromate	$Cr_2O_7^{2-}$	thiosulfate	$S_2O_3^{2-}$
iodate	IO_3^-	arsenite	AsO_3^{3-}
periodate	IO_4^-	arsenate	AsO_4^{3-}
manganate	MnO_4^{2-}		
permanganate	MnO_4^-	acetate	$C_2H_3O_2^-$ or CH_3COO^-
		cyanide	CN^-

Ions are usually named for the metallic atom within the compound

Suffixes…

-ium	positive charge like metals
-ate	the most common number of oxygen atoms for this ion
-ite	one less oxygen

Prefixes…

di-	two (e.g., dihydrogen)
thio-	one oxygen atom is replaced with a sulfur atom
per-	one extra oxygen
hypo-	one less oxygen atom

Memorization Tricks…

acetate	$C_2H_3O_2^-$ or CH_3COO^- are both pains in the *!#$% to memorize
arsenate	arsenic sounds like the word *arse,* which is the Scottish version of *!#$%
cyanide	the name contains the letters *C* and *N* like the formula CN^-

Common Polyatomic Ions – Organized by Charge Patterns			
Ion Name	Formula	Ion Name	Formula
ammonium	NH_4^+	carbonate	CO_3^{2-}
hydronium	H_3O^+	chromate	CrO_4^{2-}
		dichromate	$Cr_2O_7^{2-}$
bromite	BrO_2^-	manganate	MnO_4^{2-}
bromate	BrO_3^-	oxide	O^{2-}
hydrogen carbonate	HCO_3^-	peroxide	O_2^{2-}
hypochlorite	ClO^-	hydrogen phosphate	HPO_4^{2-}
chlorite	ClO_2^-	sulfite	SO_3^{2-}
chlorate	ClO_3^-	sulfate	SO_4^{2-}
perchlorate	ClO_4^-	thiosulfate	$S_2O_3^{2-}$
iodate	IO_3^-		
periodate	IO_4^-	arsenite	AsO_3^{3-}
permanganate	MnO_4^-	arsenate	AsO_4^{3-}
nitrite	NO_2^-	phosphite	PO_3^{3-}
nitrate	NO_3^-	phosphate	PO_4^{3-}
hydroxide	OH^-		
dihydrogen phosphate	$H_2PO_4^-$		
hydrogen sulfate	HSO_4^-		
acetate	$C_2H_3O_2^-$ or CH_3COO^-		
cyanide	CN^-		

Common Monatomic Ions:

Ion source	name	charge
copper (I)	cuprous	Cu^+
copper (II)	cupric	Cu^{2+}
iron (II)	ferrous	Fe^{2+}
iron (III)	ferric	Fe^{3+}
lead (II)	plumbous	Pb^{2+}
lead (IV)	plumbic	Pb^{4+}
mercury (I)	mercurous	Hg^{2+}
mercury (II)	mercuric	Hg^{2+}
tin (II)	stannous	Sn^{2+}
tin (IV)	stannic	Sn^{4+}
chromium (II)	chromous	Cr^{2+}
chromium (III)	chromic	Cr^{3+}
manganese (II)	manganous	Mn^{2+}
manganese (III)	manganic	Mn^{3+}
cobalt (II)	colbaltous	Co^{2+}
cobalt (III)	colbaltic	Co^{3+}

Silicates (family of polyatomic anions):

generic formula is $[SiO_{4-x}^{(4-2x)-}]_n$ where $0 \leq x \leq 2$

orthosilicate SiO_4^{4-} (x=0)
metasilicate SiO_3^{2-} (x=1)
pyrosilicate $Si_2O_7^{6-}$ (x=0.5, n=2)

Silicate anions are often large polymeric molecules with a large variety of molecular structures including chains, rings, double chains, and sheets. The term "silicate" is used to describe ionic solids such as rocks and minerals common to geology and astronomy. Examples include granite, gravel, garnet, cement, ceramics, glass, etc.

Silicates – family of polyatomic anions consisting of silicon and oxygen
Orthosilicate
Metasilicate

Pyrosilicate