

FORMULAS AND NAMES OF SOME COMMON POLYATOMIC IONS AND THE ACIDS THEY COME FROM				
ACIDS		KEY ELEMENT	FORMULA	NAME OF ION
Nitric Acid	HNO₃	Nitrogen	NO₃⁻	nitrate
Nitrous Acid	HNO ₂		NO ₂ ⁻	nitrite
			NH ₄ ⁺	ammonium
Sulfuric Acid	H₂SO₄	Sulfur	SO₄²⁻	sulfate
			HSO ₄ ⁻	bisulfate or hydrogen sulfate
Sulfurous Acid	H ₂ SO ₃		SO ₃ ²⁻	sulfite
			HSO ₃ ⁻	bisulfite or hydrogen sulfite
Phosphoric Acid	H₃PO₄	Phosphorus	PO₄³⁻	phosphate
			HPO ₄ ²⁻	hydrogen phosphate
			H ₂ PO ₄ ⁻	dihydrogen phosphate
Phosphorous Acid	H ₃ PO ₃		PO ₃ ³⁻	phosphite
Carbonic Acid	H₂CO₃	Carbon	CO₃²⁻	carbonate
			HCO ₃ ⁻	bicarbonate or hydrogen carbonate
			C ₂ O ₄ ²⁻	oxalate
Acetic Acid	HC₂H₃O₂		C₂H₃O₂⁻	acetate
			CN ⁻	cyanide
		Chlorine	ClO ₄ ⁻	perchlorate
Chloric Acid	HClO₃		ClO₃⁻	chlorate
Chlorous Acid	HClO ₂		ClO ₂ ⁻	chlorite
			ClO ⁻	hypochlorite
Boric Acid	H₃BO₃	Boron	BO₃³⁻	borate
		Hydrogen	H₃O⁺	hydronium
			OH ⁻	hydroxide
		Metals	MnO ₄ ⁻	permanganate
			CrO ₄ ²⁻	chromate
			Cr ₂ O ₇ ²⁻	dichromate

Note the following concerning polyatomic ions:

- Most of the ions have a negative charge, which can vary from -1 to -3. Only two positive ions are listed in the table: NH₄⁺ (ammonium) and H₃O⁺ (hydronium).
- Two of the polyatomic ions, OH⁻ (hydroxide) and CN⁻ (cyanide), have names ending in **-ide**. These names represent exceptions to the rule that the suffix **-ide** be reserved for use in naming binary ionic compounds.
- A number of **-ate**, **-ite**, pairs of ions exist, for example, SO₄²⁻ (sulfate) and SO₃²⁻ (sulfite). The ion in the pair with the higher number of oxygens is always the **-ate** ion. The **-ite** ion always contains one less oxygen than the **-ate** ion.
- A number of pairs of ions exist where one member of the pair differs from the other by having a hydrogen atom present, for example CO₃²⁻ (carbonate) and HCO₃⁻ (bicarbonate or hydrogen carbonate). In such pairs, the charge on the hydrogen containing ion is always one less than that on the other ion.

PERIODIC CHART SHOWING COMMON FIXED-CHARGE METALLIC AND NON-METALLIC IONS

IA	IIA											IB	IIB	IIIA	IVA	VA	VIA	VIIA	
																N ³⁻	O ²⁻	F ⁻	
Li ⁺	Be ²⁺															P ³⁻	S ²⁻	Cl ⁻	
Na ⁺	Mg ²⁺													Al ³⁺				Br ⁻	
K ⁺	Ca ²⁺											Zn ²⁺	Ga ³⁺					I ⁻	
Rb ⁺	Sr ²⁺											Ag ⁺	Cd ²⁺						
Cs ⁺	Ba ²⁺																		

COMMON VARIABLE-CHARGE METALLIC ELEMENT IONS AND THEIR CHARGES:

Chromium:	Cr ²⁺ , Cr ³⁺
Cobalt	Co ²⁺ , Co ³⁺
Copper	Cu ⁺ , Cu ²⁺
Gold	Au ⁺ , Au ³⁺
Iron	Fe ²⁺ , Fe ³⁺
Lead	Pb ²⁺ , Pb ⁴⁺
Manganese	Mn ²⁺ , Mn ³⁺
Tin	Sn ²⁺ , Sn ⁴⁺

COMPARISON OF PREFERRED AND OLD SYSTEM NAMES FOR SELECTED METAL IONS

ELEMENT	IONS	PREFERRED NAME	OLD SYSTEM
Copper	Cu ⁺	copper (I)	cuprous
	Cu ²⁺	copper (II)	cupric
Iron	Fe ²⁺	iron (II)	ferrous
	Fe ³⁺	iron (III)	ferric
Tin	Sn ²⁺	tin (II)	stannous
	Sn ⁴⁺	tin (IV)	stannic
Lead	Pb ²⁺	lead (II)	plumbous
	Pb ⁴⁺	lead (IV)	plumbic
Gold	Au ⁺	gold (I)	aurous
	Au ³⁺	gold (III)	auric

GREEK NUMERICAL PREFIXES

Greek Prefix	Number
Mono-	1
Di-	2
Tri-	3
Tetra-	4
Penta-	5
Hexa-	6
Hepta-	7
Octa-	8
Ennea- (or Nona-)	9
Deca	10