

AP Chemistry Ion Sheet -- Chemical Nomenclature

You have a choice: (a) You can memorize this list. (b) You can memorize some acid formulas and names and use them to predict the names and formulas of the polyatomic anions. In the following list: (a) The first name given is the IUPAC or Stock System name. (b) The second name is a traditional name.

I. Monatomic Anions (-ide suffix):

hydride	H ⁻¹
fluoride	F ⁻¹
chloride	Cl ⁻¹
bromide	Br ⁻¹
iodide	I ⁻¹
astatide	At ⁻¹

oxide	O ⁻²
sulfide	S ⁻²
selenide	Se ⁻²
telluride	Te ⁻²

nitride	N ⁻³
phosphide	P ⁻³
arsenide	As ⁻³

carbide	C ⁻⁴
silicide	Si ⁻⁴

II. Polyatomic Anions (-ite/-ate suffix)

polyatomic anions with hydrogen:

hydrogen carbonate/bicarbonate	HCO ₃ ⁻¹
hydrogen sulfate/bisulfate	HSO ₄ ⁻¹
hydrogen sulfite/bisulfite	HSO ₃ ⁻¹
monohydrogen phosphate	HPO ₄ ⁻²
dihydrogen phosphate	H ₂ PO ₄ ⁻¹
hydrogen oxalate/binoxalate	HC ₂ O ₄ ⁻¹
hydrogen phthalate/biphthalate	HC ₈ H ₄ O ₄ ⁻¹

polyatomic anions with sulfur:

thiocyanate	SCN ⁻¹
thiosulfate	S ₂ O ₃ ⁻²

monovalent polyatomic anions:

nitrate	NO ₃ ⁻¹
nitrite	NO ₂ ⁻¹

perchlorate	ClO ₄ ⁻¹
chlorate	ClO ₃ ⁻¹
chlorite	ClO ₂ ⁻¹
hypochlorite	ClO ⁻¹

perbromate	BrO ₄ ⁻¹
bromate	BrO ₃ ⁻¹
bromite	BrO ₂ ⁻¹
hypobromite	BrO ⁻¹

periodate	IO ₄ ⁻¹
iodate	IO ₃ ⁻¹
iodite	IO ₂ ⁻¹
hypoiodite	IO ⁻¹

permanganate	MnO ₄ ⁻¹
manganate	MnO ₃ ⁻¹

cyanate	OCN ⁻¹
acetate	C ₂ H ₃ O ₂ ⁻¹
hydroxide	OH ⁻¹
cyanide	CN ⁻¹

divalent polyatomic anions:

sulfate	SO ₄ ⁻²
sulfite	SO ₃ ⁻²

chromate	CrO ₄ ⁻²
chromite	CrO ₃ ⁻²
dichromate	Cr ₂ O ₇ ⁻²

carbonate	CO ₃ ⁻²
oxalate	C ₂ O ₄ ⁻²
phthalate	C ₈ H ₄ O ₄ ⁻²
peroxide	O ₂ ⁻²

tri- and tetravalent polyatomic anions:

perborate	BO ₄ ⁻³
borate	BO ₃ ⁻³

phosphate	PO ₄ ⁻³
phosphite	PO ₃ ⁻³

arsenate	AsO ₄ ⁻³
arsenite	AsO ₃ ⁻³

silicate	SiO ₄ ⁻⁴
----------	--------------------------------

AP Chemistry Ion Sheet -- Chemical Nomenclature

You have a choice: (a) You can memorize this list. (b) You can learn to use the periodic chart to predict the positive charges of the metal and metalloid cations. In the following list: (a) The first name given is the IUPAC or Stock System name. (b) The second name is a traditional name.

I. Monatomic Cations

monovalent cations: (Table 8-1 and 8-2)

hydrogen	H ⁺¹
lithium	Li ⁺¹
sodium	Na ⁺¹
potassium	K ⁺¹
rubidium	Rb ⁺¹
cesium	Cs ⁺¹
francium	Fr ⁺¹

ammonium	NH ₄ ⁺¹
silver	Ag ⁺¹
copper (I) or cuprous	Cu ⁺¹
gold (I) or aurous	Au ⁺¹
mercury (I) or mercurous (Hg ⁺¹) in	Hg ₂ ⁺²

divalent cations: (Table 8-1 and 8-2)

beryllium	Be ⁺²
magnesium	Mg ⁺²
calcium	Ca ⁺²
strontium	Sr ⁺²
barium	Ba ⁺²
radium	Ra ⁺²

zinc	Zn ⁺²
cadmium	Cd ⁺²
copper (II) or cupric	Cu ⁺²
mercury (II) or mercuric	Hg ⁺²
chromium (II) or chromous	Cr ⁺²

manganese (II) or manganous	Mn ⁺²
iron (II) or ferrous	Fe ⁺²
cobalt (II) or cobaltous	Co ⁺²
nickel (II) or nickelous	Ni ⁺²
tin (II) or stannous	Sn ⁺²
lead (II) or plumbous	Pb ⁺²

trivalent cations (Table 8-1 and 8-2)

aluminum	Al ⁺³
gold (III) or auric	Au ⁺³
chromium (III) or chromic	Cr ⁺³
manganese (III) or manganic	Mn ⁺³
iron (III) or ferric	Fe ⁺³
cobalt (III) or cobaltic	Co ⁺³
nickel (III) or nickelic	Ni ⁺³
cerium (III) or cerous	Ce ⁺³
arsenic (III) or arsenous	As ⁺³
antimony (III) or antimonous	Sb ⁺³
bismuth (III) or bismuthous	Bi ⁺³

tetra- & pentavalent cations (Table 8-2)

tin (IV) or stannic	Sn ⁺⁴
lead (IV) or plumbic	Pb ⁺⁴
cerium (IV) or ceric	Ce ⁺⁴
arsenic (V) or arsenic	As ⁺⁵
antimony (V) or antimonic	Sb ⁺⁵
bismuth (V) or bismuthic	Bi ⁺⁵

Handout Table 8-2: Positive Ions Whose Charges Vary

IUPAC Name	root	Traditional Name	
		-ous ending	-ic ending
copper (I) and (II)	cupr-	Cu ⁺¹	Cu ⁺²
gold (I) and (III)	aur-	Au ⁺¹	Au ⁺³
mercury (I) and (II)	mercur-	Hg ₂ ⁺²	Hg ⁺²
chromium (II) and (III)	chrom-	Cr ⁺²	Cr ⁺³
manganese (II) and (III)	mangan-	Mn ⁺²	Mn ⁺³
iron (II) and (III)	ferr-	Fe ⁺²	Fe ⁺³
cobalt (II) and (III)	cobalt-	Co ⁺²	Co ⁺³
nickel (II) and (III)	nickel-	Ni ⁺²	Ni ⁺³
tine (II) and (IV)	stann-	Sn ⁺²	Sn ⁺⁴
lead (II) and (IV)	plumb-	Pb ⁺²	Pb ⁺⁴
cerium (III) and (IV)	cer-	Ce ⁺³	Ce ⁺⁴
arsenic (III) and (V)	arsen-	As ⁺³	As ⁺⁵
antimony (III) and (V)	antimon-	Sb ⁺³	Sb ⁺⁵
bismuth (III) and (V)	bismuth-	Bi ⁺³	Bi ⁺⁵