

Common Nonmetallic ROOTS

H = hydr-	B = bor-
C = carb-	N = nitr-
O = ox-	F = fluor-
Si = silic-	P = phosph-
S = sulf-	Cl = chlor-
As = arsen-	Se = selen-
Br = brom-	Sb = antimony-
I = iod-	



Common NONMETAL Ions

S^{2-} sulfide	Br^{-1} bromide
F^{-1} fluoride	H^{-1} hydride
Cl^{-1} chloride	I^{-1} iodide
P^{3-} phosphide	O^{2-} oxide
N^{3-} nitride	Se^{3-} selenide

Greek PREFIXES

mono- one	hexa- six
di- two	hepta- seven
tri- three	octa- eight
tetra- four	nona- nine
penta- five	deca- ten

Common METAL Ions

Cu^{+} copper (I) (cuprous)	Mn^{2+} manganese (II)
Cu^{2+} copper (II) (cupric)	Ni^{2+} nickel (II)
Fe^{2+} iron (II) (ferrous)	Cr^{2+} chromium (II)
Fe^{3+} iron (III) (ferric)	Cr^{3+} chromium (III)
Hg_2^{2+} mercury (I) (mercurious)	Co^{2+} cobalt (II)
Hg^{2+} mercury (II) (mercuric)	
Pb^{2+} lead (II) (plumbous)	
Pb^{4+} lead (IV) (plumbic)	
Sn^{2+} tin (II) (stannous)	
Sn^{4+} tin (IV) (stannic)	

Polyatomic Ions

BO_3^{3-} borate ion	
BrO_3^{-} bromate ion	
BrO_4^{-} perbromate	
$B_4O_7^{2-}$ tetraborate	
$C_2H_3O_2^{-}$ acetate ion (CH_3COO^{-})	
$C_6H_5O_7^{3-}$ citrate ion	
ClO^{-} hypochlorite ion	
ClO_2^{-} chlorite ion	
ClO_3^{-} chlorate ion	
ClO_4^{-} perchlorate ion	
CN^{-} cyanide ion	
CO_3^{2-} carbonate ion	
$C_2O_4^{2-}$ oxalate ion	
CrO_4^{2-} chromate ion	
$Cr_2O_7^{2-}$ dichromate ion	
HPO_4^{2-} hydrogen phosphate ion	
HSO_4^{-} hydrogen sulfate ion	
HCO_3^{-} hydrogen carbonate ion	
$H_2PO_4^{-}$ dihydrogen phosphate ion	
IO^{-} hypiodite ion	
IO_2^{-} iodite ion	
IO_3^{-} iodate ion	
IO_4^{-} periodate ion	
MnO_4^{-} permanganate ion	
NH_4^{+} ammonium ion	SeO_3^{2-} selenite ion
NO_2^{-} nitrite ion	SeO_4^{2-} selenate ion
NO_3^{-} nitrate ion	SiO_4^{4-} silicate ion
O_2^{2-} peroxide ion	$S_2O_3^{2-}$ thiosulfate ion
OH^{-} hydroxide ion	SO_3^{2-} sulfite ion
PO_3^{3-} phosphite ion	SO_4^{2-} sulfate ion
PO_4^{3-} phosphate ion	SCN^{-} thiocyanate ion

Solubility Rules

Rule #1 – All alkali metal compounds are soluble.

Rule #2 – All ammonium salts are soluble.

Rule #3 – All nitrate, chlorate, acetate and perchlorate salts are soluble.

Rule #4 – All chloride, bromide and iodide salts are soluble.

EXCEPT – Ag^+ , Hg_2^{2+} , Pb_2^{2+}

Rule #5 – All sulfates are soluble.

EXCEPT – Ba^{2+} , Ca^{2+} , Sr^{2+} , Hg_2^{2+} , Pb_2^{2+}

Rule #6 – All hydroxides are insoluble.

EXCEPT – Ba^{2+} , Ca^{2+} , Sr^{2+} , alkali metals

Rule #7 – All sulfides are insoluble.

EXCEPT – alkali metals and alkaline earth metals

Rule #8 – All sulfites, carbonates, chromates and phosphates are insoluble.

EXCEPT – NH_4^+ , alkali metals

"like dissolves like"

Activity Series for Metals

Potassium	K ⁺	↑ INCREASING REACTIVITY
Sodium	Na ⁺	
Lithium	Li ⁺	
Barium	Ba ²⁺	
Strontium	Sr ²⁺	
Calcium	Ca ²⁺	
Magnesium	Mg ²⁺	
Aluminum	Al ³⁺	
Manganese	Mn ²⁺	
Zinc	Zn ²⁺	
Chromium	Cr ²⁺	
Iron	Fe ²⁺	
Cadmium	Cd ²⁺	
Cobalt	Co ²⁺	
Nickel	Ni ²⁺	
Tin	Sn ²⁺	
Lead	Pb ²⁺	
Hydrogen	H ⁺	(comparison)
Antimony	Sb ²⁺	↑
Bismuth	Bi ²⁺	
Copper	Cu ²⁺	
Mercury	Hg ²⁺	
Silver	Ag ⁺	
Platinum	Pt ⁺	

H -72	Electron Affinity										He (21)
Li -60	Be (241)	→	B -23	C -122	N 0	O -142	F -322	Ne (29)			
Na -53	Mg (231)	→	Al -44	Si -119	P -74	S -200	Cl -348	Ar (35)			
K -48	Ca (156)	→	Ga (-36)	Ge -116	As -77	Se -194	Br -323	Kr (39)			
Rb -47	Sr (119)	→	In (-34)	Sn -120	Sb -101	Te -190	I -295	Xe (40)			
Cs -45	Ba (52)	→	Tl (-48)	Pb -101	Bi -101	Po (-173)	At (-270)	Rn (40)			

H 2.20																		He n.a.				
Li 0.98	Be 1.57	Electronegativity															B 2.04	C 2.55	N 3.04	O 3.44	F 3.98	Ne n.a.
Na 0.93	Mg 1.31																Al 1.61	Si 1.90	P 2.19	S 2.58	Cl 3.16	Ar n.a.
K 0.82	Ca 1.00	Sc 1.36	Ti 1.54	V 1.63	Cr 1.66	Mn 1.55	Fe 1.83	Co 1.88	Ni 1.91	Cu 1.90	Zn 1.65	Ga 1.81	Ge 2.01	As 2.18	Se 2.55	Br 2.96	Kr 3.00					
Rb 0.82	Sr 0.95	Y 1.22	Zr 1.33	Nb 1.60	Mo 2.16	Tc 1.90	Ru 2.20	Rh 2.28	Pd 2.20	Ag 1.93	Cd 1.69	In 1.78	Sn 1.96	Sb 2.05	Te 2.10	I 2.66	Xe 2.60					
Cs 0.79	Ba 0.89	La 1.10	Hf 1.30	Ta 1.50	W 2.36	Re 1.90	Os 2.20	Ir 2.20	Pt 2.28	Au 2.54	Hg 2.00	Tl 1.62	Pb 2.33	Bi 2.02	Po 2.00	At 2.20	Rn n.a.					
Fr 0.70	Ra 0.89	Ac 1.10	Rf n.a.	Db n.a.	Sg n.a.	Bh n.a.	Hs n.a.	Mt n.a.	Ds n.a.	Rg n.a.	Uub n.a.	—	Uuq n.a.	—	—	—	—					

