

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 ₄ O ₇ ²⁻ tetraborate	
C ₂ H ₃ O ₂ ⁻ acetate ion (CH ₃ COO ⁻)	
C ₆ H ₅ O 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 ₂ O ₄ ²⁻ oxalate ion	
CrO ₄ ²⁻ chromate ion	
Cr ₂ O ₇ ²⁻ dichromate ion	
HPO ₄ ²⁻ hydrogen phosphate ion	
HSO ₄ ⁻ hydrogen sulfate ion	
HCO ₃ ⁻ hydrogen carbonate ion	
H ₂ PO 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 ₂ O 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		Electron Affinity										He	
-72												(21)	
Li	Be (241)	B	C	N	O	F	Ne	-23	-122	0	-142	-322	(29)
-60		Al	Si	P	S	Cl	Ar	-44	-119	-74	-200	-348	(35)
-53	Mg (231)	Ga	Ge	As	Se	Br	Kr	(-36)	-116	-77	-194	-323	(39)
-48	Ca (156)	In	Sn	Sb	Te	I	Xe	(-34)	-120	-101	-190	-295	(40)
-47	Sr (119)	Tl	Pb	Bi	Po	At	Rn	(-48)	-101	-101	(-173)	(-270)	(40)
-45	Ba (52)												

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

