SOLUBILITY OF SOME IONIC COMPOUNDS IN WATER

NEGATIVE ION (ANION)	PLUS	POSITIVE ION (CATION)	FORM A COMPOUND WHICH IS	
Any anion	+	Alkali metal ions (Li^+, Na^+, K^+, Rb^+, or Cs^+)	"	Soluble, i.e., >0.1 mol/L
Any anion	+	Ammonium ion, NH_4^+	"	Soluble
Nitrate, NO_3^-	+	Any cation	"	Soluble
Acetate, CH_3COO^-	+	Any cation except Ag^+	"	Soluble
Chloride, Cl^-, or Bromide, Br^-, or Iodide, I^-	+	Ag^+, Pb^{2+}, Hg_2^{2+}, or Cu^+	"	Not soluble
	+	Any other cation	"	Soluble
Sulfate, SO_4^{2-}	+	Ca^{2+}, Sr^{2+}, Ba^{2+}, Ra^{2+}, Ag^+, or Pb^{2+}	"	Not soluble
	+	Any other cation	"	Soluble
Sulfide, S^{2-}	+	Alkali ions or NH_4^+,	"	Soluble
	+	Be^{2+}, Mg^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, or Ra^{2+}	"	Soluble
	+	Any other cation	"	Not soluble
Hydroxide, OH^-	+	Alkali ions or NH_4^+	"	Soluble
	+	Sr^{2+}, Ba^{2+}, or Ra^{2+}	"	Slightly soluble
	+	Any other cation	"	Not soluble
Phosphate, PO_4^{3-}, or Carbonate, CO_3^{2-}, or Sulfite, SO_3^{2-}	+	Alkali ions or NH_4^+	"	Soluble
	+	Any other cation	"	Not soluble

ACTIVITY SERIES

METALS	NONMETALS
decreasing activity ↓	
lithium	fluorine
potassium	chlorine
calcium	bromine
sodium	iodine
magnesium	
aluminum	
zinc	
chromium	
iron	
nickel	
tin	
lead	
hydrogen	
copper	
silver	
mercury	
platinum	
gold	

Atmospheric nitrogen—98.81[illegible]% N_2, 1.1[illegible]% inert gases

TABLE A-12 SOLUBILITY CHART

	acetate	bromide	carbonate	chlorate	chloride	chromate	hydroxide	iodine	nitrate	oxide	phosphate	silicate	sulfate	sulfide
aluminum	S	S	—	S	S	—	A	S	S	a	A	I	S	d
ammonium	S	S	S	S	S	S	S	S	S	—	S	—	S	S
barium	S	S	P	S	S	A	S	S	S	S	A	S	a	d
calcium	S	S	P	S	S	S	S	S	S	P	P	P	S	S
copper(II)	S	S	—	S	S	—	A	—	S	A	A	A	S	A
hydrogen	S	S	—	S	S	—	—	S	S	S	S	I	S	S
iron(II)	—	S	P	S	S	—	A	S	S	A	A	—	S	A
iron(III)	—	S	—	S	S	A	A	S	S	A	P	—	P	d
lead(II)	S	S	A	S	S	A	P	P	S	P	A	A	P	A
magnesium	S	S	P	S	S	S	A	S	S	A	P	A	S	d
manganese(II)	S	S	P	S	S	—	A	S	S	A	P	I	S	A
mercury(I)	P	A	A	S	a	P	—	A	S	A	A	—	P	I
mercury(II)	S	S	—	S	S	P	A	P	S	P	A	—	d	I
potassium	S	S	S	S	S	S	S	S	S	S	S	S	S	S
silver	P	a	A	S	a	P	—	I	S	P	A	—	P	A
sodium	S	S	S	S	S	S	S	S	S	d	S	S	S	S
strontium	S	S	P	S	S	P	S	S	S	S	A	A	P	S
tin(II)	d	S	—	S	S	A	A	S	d	A	A	—	S	A
tin(IV)	S	S	—	—	S	S	P	d	—	A	—	—	S	A
zinc	S	S	P	S	S	P	A	S	S	P	A	A	S	A

S = soluble in water. A = soluble in acids, insoluble in water. P = partially soluble in water, soluble in dilute acids.
I = insoluble in dilute acids and in water. a = slightly soluble in acids, insoluble in water. d = decomposes in water.

TABLE 8-3 *Activity Series of the Elements*

Activity of metals		Activity of halogen nonmetals
Li Rb K Ba Sr Ca Na	React with cold H_2O and acids, replacing hydrogen. React with oxygen, forming oxides.	F_2 Cl_2 Br_2 I_2
Mg Al Mn Zn Cr Fe Cd	React with steam (but not cold water) and acids, replacing hydrogen. React with oxygen, forming oxides.	
Co Ni Sn Pb	Do not react with water. React with acids, replacing hydrogen. React with oxygen, forming oxides.	
H_2 Sb Bi Cu Hg	React with oxygen, forming oxides.	
Ag Pt Au	Fairly unreactive, forming oxides only indirectly.	