



Chemistry References – Solubility Rules, etc.

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SOLUBILITY RULES

1. Compounds containing Group IA, NH_4^+ , NO_3^- , ClO_4^- , and $\text{C}_2\text{H}_3\text{O}_2^-$ or $(\text{CH}_3\text{COO}^-)$ are soluble.
2. Compounds containing chlorides (Cl^-), bromides (Br^-), iodides (I^-), and sulfates (SO_4^{2-}) are soluble except when they also contain silver (Ag^-), mercury (Hg_2^{2+}), or lead (Pb^{2+}).
3. Most carbonates (CO_3^{2-}), phosphates (PO_4^{3-}), and hydroxides (OH^-) are insoluble in water. Important exceptions are those of Na^+ , K^+ , or NH_4^+ , as well as barium hydroxide, $\text{Ba}(\text{OH})_2$.
4. Compounds not covered by the above guidelines are most likely insoluble.

7 STRONG ACIDS

HCl
HBr
HI
 HNO_3
 H_2SO_4
 HClO_4
 HClO_3

7 DIATOMIC MOLECULES

H_2
 N_2
 O_2
 F_2
 Cl_2
 Br_2
 I_2

Two Less oxygen than the most common starts with "hypo-" and ends with "-ite"	One Less oxygen than the most common ends with "-ite"	THE MOST COMMON OXYANION ENDS WITH "-ATE"		One More oxygen than the most common starts with "per-" and ends with "-ate"
		Four Oxygens	Three Oxygens	
hypochlorite: ClO^-	chlorite: ClO_2^-		chlorate: ClO_3^-	perchlorate: ClO_4^-
hyponitrite: NO^-	nitrite: NO_2^-		nitrate: NO_3^-	pernitrate: NO_4^-
hyposulfite: SO_2^{2-}	sulfite: SO_3^{2-}	sulfate: SO_4^{2-}		persulfate: SO_5^{2-}
hypophosphite: PO_2^{3-}	phosphite: PO_3^{3-}	phosphate: PO_4^{3-}		perphosphate: PO_5^{3-}
		chromate: CrO_4^{2-}		
			carbonate: CO_3^{2-}	

MOST COMMON POLYATOMIC IONS

ACTIVITY SERIES

Positive ions (cations)		
1+	2+	3+
ammonium (NH ₄ ⁺)	cadmium (Cd ²⁺)	aluminum (Al ³⁺)
copper(I) (Cu ⁺)	cobalt(II) (Co ²⁺)	chromium(III) (Cr ³⁺)
hydrogen (H ⁺)	copper(II) (Cu ²⁺)	iron(III) (Fe ³⁺)
silver (Ag ⁺)	iron (Fe ²⁺)	
	lead (Pb ²⁺)	
	manganese(II) (Mn ²⁺)	
	mercury(I) (Hg ₂ ²⁺)	
	mercury(II) (Hg ²⁺)	
	nickel (Ni ²⁺)	
	tin (Sn ²⁺)	
	zinc (Zn ²⁺)	

Negative ions (anions)		
1-	2-	3-
acetate (C ₂ H ₃ O ₂ ⁻)	carbonate (CO ₃ ²⁻)	nitride (N ³⁻)
chlorate (ClO ₃ ⁻)	chromate (CrO ₄ ²⁻)	phosphate (PO ₄ ³⁻)
cyanide (CN ⁻)	dichromate (Cr ₂ O ₇ ²⁻)	phosphide (P ³⁻)
dihydrogen phosphate (H ₂ PO ₄ ⁻)	hydrogen phosphate (HPO ₄ ²⁻)	
hydride (H ⁻)	oxide (O ²⁻)	
bicarbonate (HCO ₃ ⁻)	peroxide(O ₂ ²⁻)	
hydroxide (OH ⁻)	sulfate (SO ₄ ²⁻)	
nitrate (NO ₃ ⁻)	sulfide (S ²⁻)	
nitrite (NO ₂ ⁻)	sulfite (SO ₃ ²⁻)	
perchlorate (ClO ₄ ⁻)		
permanganate (MnO ₄ ⁻)		
thiocyanate(SCN ⁻)		

Most Active ↑

Li
K
Ba
Sr
Ca
Na
Mg
Al
Mn
Zn
Cr
Fe
Cd
Co
Ni
Sn
Pb
H
Cu
Ag
Hg
Pt
Au
F
O
Cl
Br
I