

TABLE 8.3 Solubility rules for ionic compounds

NH_4^+	All common salts of ammonium ion are soluble.
$\left. \begin{array}{l} \text{Na}^+ \\ \text{K}^+ \end{array} \right\}$	All common salts of sodium and potassium are soluble.
NO_3^-	All nitrates are soluble.
$\text{C}_2\text{H}_3\text{O}_2^-$	All acetates are soluble except iron(III) acetate, $\text{Fe}(\text{C}_2\text{H}_3\text{O}_2)_3$.
$\left. \begin{array}{l} \text{Cl}^- \\ \text{Br}^- \\ \text{I}^- \end{array} \right\}$	All chlorides, bromides, and iodides are soluble except those of Ag^+ , Hg^+ , and Pb^{2+} . PbCl_2 and PbBr_2 are slightly soluble in hot water.
SO_4^{2-}	All sulfates are soluble except CaSO_4 , BaSO_4 , PbSO_4 , and Ag_2SO_4 .
$\left. \begin{array}{l} \text{PO}_4^{3-} \\ \text{CO}_3^{2-} \end{array} \right\}$	Only alkali metal and NH_4^+ phosphates and carbonates are soluble.
S^{2-}	Only alkali metal and NH_4^+ sulfides are soluble.
OH^-	Only alkali metal and NH_4^+ hydroxides are soluble. Ca^{2+} , Ba^{2+} , and Sr^{2+} hydroxides are slightly soluble.

The Activity Series of Metals

Li	→ 1+
K	→ 1+
Ba	→ 2+
Ca	→ 2+
Na	→ 1+
Mg	→ 2+
Al	→ 3+
Mn	→ 2+
Zn	→ 2+
Cr	→ 3+
Fe	→ 2+
Co	→ 2+
Ni	→ 2+
Sn	→ 2+
Pb	→ 2+
H	→ 1+
Cu	→ 2+
Ag	→ 1+
Hg	→ 2+
Pt	→ 2+
Au	→ 3+

The Activity Series of Nonmetals

F	→ 1-
Cl	→ 1-
Br	→ 1-
I	→ 1-

Precipitation Chart: aq = aqueous s = solid g = gas n = doesn't occur l = liquid

	C ₂ H ₃ O ₂ ¹⁻	Br ¹⁻	CO ₃ ²⁻	Cl ¹⁻	CrO ₄ ²⁻	Cr ₂ O ₇ ²⁻	OH ¹⁻	I ¹⁻	NO ₃ ¹⁻	PO ₄ ³⁻	SO ₄ ²⁻	S ²⁻
Al ³⁺	aq	aq	n	aq	n	n	s	aq	aq	s	aq	d
NH ₄ ¹⁺	aq	aq	aq	aq	aq	aq	aq	aq	aq	aq	aq	aq
Ba ²⁺	aq	aq	s	aq	s	s	aq	aq	aq	s	s	d
Ca ²⁺	aq	aq	s	aq	aq	aq	s	aq	aq	s	s	d
Cu ²⁺	aq	aq	s	aq	s	s	s	n	aq	s	aq	s
Fe ²⁺	aq	aq	s	aq	n	n	s	aq	aq	s	aq	s
Fe ³⁺	aq	aq	n	aq	s	s	s	n	aq	s	s	d
Pb ²⁺	aq	s	s	s	s	s	s	s	aq	s	s	s
Mg ²⁺	aq	aq	s	aq	aq	aq	s	aq	aq	s	aq	d
K ¹⁺	aq	aq	aq	aq	aq	aq	aq	aq	aq	aq	aq	s
Ag ¹⁺	aq	s	s	s	s	s	n	s	aq	s	s	s
Na ¹⁺	aq	aq	aq	aq	aq	aq	aq	aq	aq	aq	aq	aq
Zn ²⁺	aq	aq	s	aq	aq	aq	s	aq	aq	s	aq	s
Co ²⁺	aq	aq	s	aq	aq	aq	s	aq	aq	s	aq	s
H ¹⁺	aq	aq	aq	aq	aq	aq	l	aq	aq	aq	aq	g

Diatomic Molecules: Br₂I₂N₂Cl₂H₂O₂F₂

Polyatomic ions

- Ammonium: NH₄¹⁺
- Acetate: C₂H₃O₂¹⁻
- Cyanide: CN¹⁻
- Permanganate: MnO₄¹⁻
- Borate: BO₃³⁻
- Phosphate: PO₄³⁻

- Hypochlorite: ClO¹⁻
- Chlorite: ClO₂¹⁻
- Chlorate: ClO₃¹⁻
- Perchlorate: ClO₄¹⁻
- Bicarbonate: HCO₃¹⁻
- Carbonate: CO₃²⁻

- Nitrate: NO₃¹⁻
- Nitrite: NO₂¹⁻
- Sulfate: SO₄²⁻
- Sulfite: SO₃²⁻
- Chromate: CrO₄²⁻
- Dichromate: Cr₂O₇²⁻