

Chemistry

Solubility Rules of Ionic Compounds

These rules are to be used as a guide in predicting the solubility of ionic solids in aqueous solutions. It must be noted that there is no sharp distinction between soluble and insoluble compounds.

Category of Ionic Salt	Soluble	Insoluble	Soluble Salt Examples
Alkali Metals, Ammonium	All	None	Li_2SO_4 , NaCl , NH_4Cl , KNO_3
Nitrates (NO_3^{-1}), Chlorates (ClO_3^{-1}), perchlorates (ClO_4^{-1}), acetates ($\text{C}_2\text{H}_3\text{O}_2^{-1}$)	All	None	$\text{Ba}(\text{NO}_3)_2$, NaClO_4 , $\text{Al}(\text{C}_2\text{H}_3\text{O}_2)_3$
Chlorides (Cl^{-1}), bromides (Br^{-1}), iodides (I^{-1})	Most metals	Ag^{+1} , Pb^{+2} , and Hg_2^{+2} .	KCl , BaCl_2
Sulfates (SO_4^{-2})	Most Metals	Ca^{2+} , Sr^{2+} , Ba^{2+} , Pb^{2+} , Hg_2^{+2}	Na_2SO_4 , MgSO_4
Metal Oxides (O^{-2}), Hydroxides (OH^{-1})	Alkali Metals, Ca^{2+} , Sr^{2+} , Ba^{2+}	All other metals	Na_2O , CaO , $\text{Mg}(\text{OH})_2$
Carbonates (CO_3^{-2}), chromates (CrO_4^{-2}), dichromates ($\text{Cr}_2\text{O}_7^{-2}$), phosphates (PO_4^{-3}), sulfides (S^{-2}), and sulfites (SO_3^{-1})	Alkali Metals, ammonium (NH_4^{+1})	All other metals	K_3PO_4 , $(\text{NH}_4)_2\text{S}$, Na_2SO_3