

Negative Ions (Anions)	+	Positive Ions (Cations)	=	Solubility of compounds in water	Example
any anion	+	alkali ions (Li ⁺ , Na ⁺ , K ⁺ , Rb ⁺ , Cs ⁺ , Fr ⁺)	=	soluble	sodium fluoride, NaF, is soluble
any anion	+	hydrogen ion [H ⁺ _(aq)]	=	soluble	hydrogen chloride, HCl, is soluble
any anion	+	ammonium ion (NH ₄ ⁺)	=	soluble	ammonium chloride, NH ₄ Cl, is soluble
nitrate NO ₃ ⁻	+	any cation	=	soluble	potassium nitrate, KNO ₃ , is soluble
acetate (CH ₃ COO ⁻)	+	any cation	=	soluble	sodium acetate, CH ₃ COONa, is soluble
Chloride (Cl ⁻), Bromide (Br ⁻), Iodide (I ⁻)	+	silver (Ag ⁺), lead (Pb ²⁺), mercury (Hg ²⁺), copper (Cu ⁺), thallium (Tl ⁺)	=	low solubility (insoluble)	silver chloride, AgCl, forms a white precipitate (a white solid)
	+	any other cation	=	soluble	potassium bromide, KBr, is soluble
Sulphate (SO ₄ ²⁻)	+	calcium (Ca ²⁺), strontium (Sr ²⁺), barium (Ba ²⁺), silver (Ag ⁺), lead (Pb ²⁺), radium (Ra ²⁺)	=	low solubility (insoluble)	barium sulphate, BaSO ₄ , forms a white precipitate (a white solid)
	+	any other cation	=	soluble	copper sulphate, CuSO ₄ , is soluble
Sulfide S ²⁻	+	alkali ions (Li ⁺ , Na ⁺ , K ⁺ , Rb ⁺ , Cs ⁺ , Fr ⁺), alkali earth metals (Be ²⁺ , Mg ²⁺ , Ca ²⁺ , Sr ²⁺ , Ba ²⁺ , Ra ²⁺), and H ⁺ _(aq) , NH ₄ ⁺	=	soluble	magnesium sulfide, MgS, is soluble
	+	any other cation	=	low solubility (insoluble)	zinc sulfide, ZnS, is insoluble
Hydroxide OH ⁻	+	alkali ions (Li ⁺ , Na ⁺ , K ⁺ , Rb ⁺ , Cs ⁺ , Fr ⁺), H ⁺ _(aq) , NH ₄ ⁺ , Sr ²⁺ , Ba ²⁺ , Ra ²⁺ , Tl ⁺	=	soluble	strontium hydroxide, Sr(OH) ₂ , is soluble
	+	any other cation	=	low solubility (insoluble)	silver hydroxide, AgOH, is insoluble (forms a precipitate)
Phosphate, PO ₄ ³⁻ , Carbonate, CO ₃ ²⁻ , sulphite, SO ₃ ²⁻	+	alkali ions (Li ⁺ , Na ⁺ , K ⁺ , Rb ⁺ , Cs ⁺ , Fr ⁺), H ⁺ _(aq) , NH ₄ ⁺	=	soluble	ammonium phosphate, (NH ₄) ₃ PO ₄ , is soluble
	+	any other cation	=	low solubility (insoluble)	magnesium carbonate, MgCO ₃ , is insoluble

In General

- All compounds of the ammonium ion (NH₄⁺), and of Alkali metal (Group IA) cations, are **soluble**.
- All nitrates and acetates (ethanoates) are **soluble**.
- All chlorides, bromides and iodides are **soluble EXCEPT** those of silver, lead and mercury(I).
- All sulphates are **soluble EXCEPT** those of silver, lead, mercury(I), barium, strontium and calcium.
- All carbonates, sulfites and phosphates are **insoluble EXCEPT** those of ammonium and Alkali metal (Group IA) cations.
- All hydroxides are **insoluble EXCEPT** those of ammonium, barium and alkali metal (Group I) cations.
- All sulfides are **insoluble EXCEPT** those of ammonium, Alkali metal (Group I) cations and Alkali earth metal (Group II) cations.
- All oxides are **insoluble EXCEPT** those of calcium, barium and Alkali metal (Group I) cations; these soluble ones actually react with the water to form hydroxides (hydrolyse).