A Summary of the Solubility Rules

For **freely soluble salts**, at least several grams of the salt will dissolve in 100g of water. For **sparingly soluble salts**, the mass of salt that dissolves in 100g of water is considerably less than one gram.

Borderline solubility: Ag(OCOCH₃):1.02 g/100g water at 20°C; silver sulfate (Ag₂SO₄): 0.57g/100g water at 0°C; and Ca(OH)₂: 0.185g/100g of water at 0°C

**Freely soluble salts:**

1. All sodium, potassium and ammonium salts are freely soluble.
2. All chlorides, bromides, and iodides are freely soluble except for those of Ag⁺, Pb²⁺, and Hg₂²⁺.
3. All nitrates, chlorates (ClO₃⁻), perchlorates (ClO₄⁻) and acetates (OCOCH₃) are freely soluble except for silver (I) acetate and mercury (I) acetate.
4. All sulfates are freely soluble except for those of Sr²⁺, Ba²⁺, and Pb²⁺. Bordeline solubility is observed for calcium sulfate and silver sulfate.

**Sparingly Soluble/Insoluble salts:**

1. All carbonates (CO₃²⁻), phosphates (PO₄³⁻), oxalates (C₂O₄²⁻), and chromates (CrO₄²⁻) are sparingly soluble except for those of sodium, potassium, and ammonium.
2. All sulfides (S²⁻) are sparingly soluble except those of Group IA and IIA metal ions and the ammonium ion.
3. All oxides and hydroxides are sparingly soluble except those of sodium and potassium. The oxides and hydroxides of Ca²⁺, Sr²⁺, and Ba²⁺ have borderline solubility. Note that soluble oxides, when dissolved in water are converted to the hydroxides.