

The Solubility Rules

1. The nitrates, chlorates, and acetates of all metals are soluble in water. Silver acetate is sparingly soluble.
2. All sodium, potassium, and ammonium salts are soluble in water.
3. The chlorides, bromides, and iodides of all metals except lead, silver, and mercury(I) are soluble in water. HgI_2 is insoluble in water. PbCl_2 , PbBr_2 , and PbI_2 are soluble in hot water. The water-insoluble chlorides, bromides, and iodides are also insoluble in dilute acids.
4. The sulfates of all metals except lead, mercury (I), barium, and calcium are soluble in water. Silver sulfate is slightly soluble. The water-insoluble sulfates are also insoluble in dilute acids.
5. The carbonates, phosphates, borates, sulfites, chromates, and arsenates of all metals except sodium, potassium, and ammonium are insoluble in water but soluble in dilute acids. MgCrO_4 is soluble in water; MgSO_3 is slightly soluble in water.
6. The sulfides of all metals except barium, calcium, magnesium, sodium, potassium, and ammonium are insoluble in water. BaS , CaS , and MgS are sparingly soluble.
7. The hydroxides of sodium, potassium, and ammonium are very soluble in water. The hydroxides of calcium and barium are moderately soluble. The oxides and hydroxides of all other metals are insoluble.

Notes

1. Bismuth and antimony salts hydrolyze in water to give basic salts. These basic salts are soluble in dilute acids but are not soluble in water.
2. Solutions of iron(III), lead, tin, mercury(II), copper, and aluminum salts, when boiled, may hydrolyze to give precipitates of the hydroxides or basic salts of these metals.