SOLUBILITY RULES

The following rules are for aqueous solutions, solutions with water as the solvent.

The molarity of a saturated solution of a soluble compound is \( \geq 0.1 \text{ M} \).

The molarity of a saturated solution of an insoluble compound is \(< 0.01 \text{ M} \).

The molarity of a saturated solution of a slightly soluble compound is \( \geq 0.01 \text{ M} \), but \(< 0.1 \text{ M} \).

1. Most sodium, potassium, and other Group 1 compounds are soluble.
   Most ammonium ion compounds are soluble.

2. Most compounds containing nitrate ion, perchlorate ion, or chlorate ion are soluble.

3. Most compounds containing acetate ion are soluble. Silver acetate is slightly soluble.

4. Most compounds containing sulfate ion are soluble.
   Most compounds containing hydrogen sulfate ion are soluble.
   Barium, strontium, and lead(II) sulfates are insoluble.
   Calcium, silver, and mercury(I) sulfates are slightly soluble.

5. Most compounds containing chloride, bromide, and iodide ions are soluble.
   Silver and mercury(I) halides are insoluble.
   Lead(II) chloride and bromide are slightly soluble; lead(II) iodide is insoluble.
   Mercury(II) chloride is soluble, mercury(II) bromide is slightly soluble, and mercury(II) iodide is insoluble.

Rule 1 takes precedence over Rules 6-10, which are for insoluble compounds.

6. Most compounds containing hydroxide ion are insoluble.
   Barium hydroxide is barely soluble.
   Calcium and strontium hydroxides are slightly soluble.

7. Most compounds containing carbonate ion are insoluble.
   Most compounds containing hydrogen carbonate ion are soluble.

8. Most compounds containing phosphate ion are insoluble.
   Most compounds containing hydrogen phosphate and dihydrogen phosphate ions are soluble.

9. Most compounds containing sulfide ion are insoluble.
   Some sulfides react with water to form \( \text{H}_2\text{S} \) and an insoluble hydroxide.

10. Most compounds containing sulfite, chromate, or oxalate ions are insoluble.