

19 • Precipitation Reactions

STUDY QUESTIONS

- Predict, on the basis of the solubility rules, which of the following salts are soluble and which are insoluble. For those that are “insoluble” look up their solubility products.
 - AgI
 - Na₃PO₄
 - BaSO₄
 - (NH₄)₂SO₄
 - NiCO₃
 - Cu(OH)₂
- Write solubility product expressions for the following salts:
 - PbSO₄
 - Ca₃(PO₄)₂
 - CuS
 - CaF₂
- If the molar concentration of lead bromide, PbBr₂, in an aqueous solution is 1.6×10^{-6} M, what is [Pb²⁺] and [Br⁻]?
- If the molar solubility of silver iodide is 1.22×10^{-8} M, what is the solubility product for AgI?
- What is the molar solubility of cadmium sulfide, CdS, if its $K_{sp} = 3.6 \times 10^{-29}$?
- K_{sp} of strontium fluoride, SrF₂, is 2.5×10^{-9} . What is the [Sr²⁺] and [F⁻] in a saturated solution of SrF₂? What is the molar solubility of SrF₂?
- What is the [Mg²⁺] in a saturated solution of magnesium fluoride, MgF₂ if its solubility product constant is 6.4×10^{-9} ? What is the [Mg²⁺] if the solution also contains 0.30 M sodium fluoride?

8. From which of the following mixtures of silver nitrate and sodium sulfite would silver sulfite precipitate? The K_{sp} for silver sulfite = 1.5×10^{-14} .
- a. 50 mL of 1.0×10^{-4} M Ag^+ and 50 mL of 1.0×10^{-4} M SO_3^{2-} .
- b. 25 mL of 1.0×10^{-3} M Ag^+ and 25 mL of 1.0×10^{-5} M SO_3^{2-} .
- c. 50 mL of 1.0×10^{-5} M Ag^+ and 100 mL of 1.0×10^{-3} M SO_3^{2-} .
9. Calculate the solubility in moles per Liter of cobalt(II) sulfide in a solution that contains 0.030 M cobalt(II) chloride. K_{sp} for cobalt sulfide $\text{CoS} = 5.9 \times 10^{-21}$.
10. Addition of a strong acid would increase the solubility of which of the following salts?
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| AgCl | CaSO_4 | CdS | CaCO_3 |
| PbBr_2 | CaHPO_4 | Cd(OH)_2 | AuCl |