

Worksheet 3.3: More K_{sp} Problems

1. A solution has a concentration of calcium ions equal to 2.5×10^{-2} M. What is the maximum concentration of sulphate ions allowed without causing precipitation?
2. A solution has a concentration of chromate ions equal to 3.00×10^{-4} M. What is the maximum concentration of silver nitrate allowed without causing precipitation?
3. A student needs to determine the concentration of carbonate ion in a sample of well water. She uses a 10.0 L sample of well water and finds she needed to add 1.75 g of calcium chloride before a precipitate of calcium carbonate appeared. What is the concentration of carbonate ion in the sample?
4. Up to 15.0 g of barium chloride can be dissolved in 2.5 L of $Al_2(SO_4)_3$ solution without occurrence of a precipitate. Find the concentration of the aluminum sulphate solution.
5. A saturated solution of silver bromate is prepared by adding 5.00 g of silver nitrate to a 2.5×10^{-2} M solution of $NaBrO_3$. What is the maximum volume of solution produced?
6. What is the maximum mass of copper (II) chloride you can add to a 100.0 L of a 0.025 M solution of sodium iodate without causing precipitation?
7. What is the maximum volume of 0.0350 M sodium sulphate solution required to obtain a saturated solution of strontium sulphate with 1.25 g of strontium nitrate?
8. 2.50 g of sodium chromate and 1.25 g of barium chloride are added to 50.0 L of water. Is the barium chromate solution obtained saturated?
9. Will a precipitate form if 750. mL of 2.0×10^{-2} M $MgCl_2$ is mixed with 2.50 L of 0.010 M Cs_2CO_3 ?
10. Will a precipitate form if 250. mL of 2.5×10^{-3} M $Sr(NO_3)_2$ is mixed with 2500. mL of 3.00×10^{-4} M $Na_2C_2O_4$? K_{sp} of $SrC_2O_4 = 4.00 \times 10^{-7}$.
11. Will a precipitate form if 250. mL of 0.500 M $Pb(NO_3)_2$ is mixed with 750. mL of 0.0250M $CaCl_2$?
12. Will a precipitate form if 500. mL of 1.20×10^{-2} M $SrCl_2$ is mixed with 500. mL of 8.00×10^{-3} M $Al_2(SO_4)_3$?