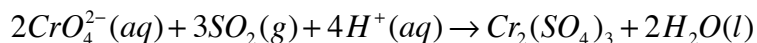
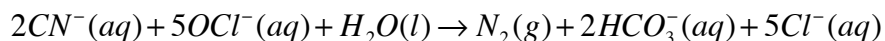


CH1020 Exercises (Worksheet 8)

1. A solution contains one or more of the following ions: Ag^+ , Ca^{2+} and Cu^{2+} . When you add sodium chloride to the solution, no precipitate forms. When you add sodium sulfate to the solution, a white precipitate forms. You filter off the precipitate and add sodium carbonate to the remaining solution, producing another precipitate. Which ions were present in the original solution? Write net ionic equations for the formation of each of the precipitates observed.
2. A solution contains one or more of the following ions: Hg_2^{2+} , Ba^{2+} , and Fe^{2+} . When you add potassium chloride to the solution, a precipitate forms. The precipitate is filtered off, and you add potassium sulfate to the remaining solution, forming no precipitate. When you add potassium carbonate to the remaining solution, a precipitate forms. Which ions were present in the original solution? Write net ionic equations for the formation of each of the precipitates observed.
3. You want to analyze a cadmium nitrate solution. What mass of NaOH is needed to precipitate the Cd^{2+} ions from 35.0 mL of 0.500 M $\text{Cd}(\text{NO}_3)_2$ solution?
4. Toxic chromate can be precipitated from an aqueous solution by bubbling SO_2 gas through the solution. How many grams of SO_2 are required to treat $3 \times 10^8 \text{ L}$ of 0.050 mM CrO_4^{2-} ?



5. Toxic cyanide ions can be removed from wastewater by adding hypochlorite:



How many liters of 0.125 M OCl^- solution are required to remove CN^- in $3.4 \times 10^6 \text{ L}$ wastewater in which the concentration is 0.58 mg/L?

6. To determine the concentration of SO_4^{2-} ion in a sample of groundwater, 100 mL of the sample is treated with 0.0250 M $\text{Ba}(\text{NO}_3)_2$, forming insoluble BaSO_4 . If 3.19 mL of the $\text{Ba}(\text{NO}_3)_2$ solution is required to reach the end point of the titration, what is the molarity of the SO_4^{2-} ?
7. We prepare a solution by mixing 0.10 L of 0.12 M sodium chloride with 0.23 L of a 0.18 M MgCl_2 solution. What volume of a 0.20 M silver nitrate solution do we need to precipitate all the Cl^- ion in the solution as silver chloride?
8. You are mixing 0.200 L of 0.200 M Na_2CO_3 solution with 0.300 L of 0.100 M SrCl_2 solution. Identify the precipitate that will form, determine the mass of the

precipitate and calculate the concentration of the ion in solution that is in excess for the precipitation reaction.

9. You are mixing 0.500L of 0.250M FeCl_3 solution with 0.500L of 0.400 M K_2SO_4 solution. Identify the precipitate that will form, determine the mass of the precipitate and calculate the concentration of the ion in solution that is in excess for the precipitation reaction.