

Gravimetric analysis of Ag

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Solution: Step 1 Determine the identity of the precipitant.

Step 2. Write a balanced equation.

Step 3. Calculate the number of moles of the precipitant.

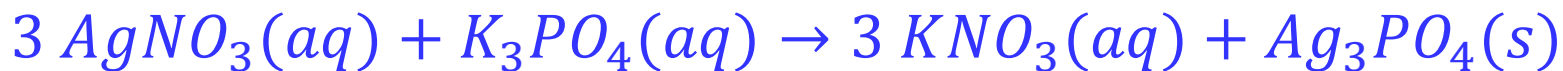
Step 4. Determine the initial concentration.

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Solution: The precipitant must be Ag_3PO_4 .

The balanced equation is:



The number of moles of the precipitant.

$$n_{\text{Ag}_3\text{PO}_4} = \frac{m_{\text{Ag}_3\text{PO}_4}}{M_{m,\text{Ag}_3\text{PO}_4}} = \frac{0.3634 \text{ gm}}{418.6 \text{ gm/mol}} = 8.68 \times 10^{-4} \text{ mol}$$

Which used the molar mass of Ag_3PO_4

$$M_{m,\text{Ag}_3\text{PO}_4} = 3(107.86) + 31 + 4(16) = 418.5 \text{ amu}$$

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What is the silver ion concentration in a solution of AgNO_3 in 50.0 mL?

The number of moles of Ag_3PO_4 is 1/3 of the initial number of moles of AgNO_3 by stoichiometry.

$$n_{\text{AgNO}_3} = 3 n_{\text{Ag}_3\text{PO}_4} = 3(8.68 \times 10^{-4}) \text{ mol}$$

Therefore the concentration in 50 mL was:

$$c_{\text{AgNO}_3} = \frac{n_{\text{AgNO}_3}}{V} = \frac{2.6 \times 10^{-3} \text{ mol}}{0.05 \text{ L}} = 0.052 \text{ M}$$