Answer on Question #72378, Chemistry / General Chemistry

Question:

A titration of 50.00 mL of a solution containing iodide is titrated to a thiocyante endpoint with 0.0683 M silver nitrate solution. The initial buret reading was 1.26 mL. At the first evidence of the red endpoint, the buret read 13.89 mL. Find the concentration of the iodide in the original solution. Express the final result also as a percentage (w/v) of calcium iodide in the solution.

Solution:

Reaction: $CaI_2 + 2\ AgNO_3 = 2\ AgI + Ca(NO_3)_2$

Volume of the reagent (silver nitrate): 13.89 - 1.26 = 12.63 mL = 0.01263 L

Amount of silver-ions: $0.0683 \cdot 0.01263 = 0.000862629$ mol

Amount of iodide-ions in the original solution is the same, therefore:

Concentration of iodide-ions: $0.000862629 / 0.05 = 0.01725$ mol/L

Mass of calcium iodide in the original solution: $\frac{1}{2} \cdot 0.000862629 \cdot 111.08 = 0.04791$ g

Percentage (w/v): $0.04791 / 0.050 = 0.9582$ g/L

Answer:

Concentration of iodide-ions: 0.01725 mol/L

Percentage (w/v) of calcium iodide: 0.9582 g/L