Student 5: Low Achieved

NZQA Intended for teacher use only

Purpose:

To investigate what happens to the vitamin C in fruit juice when it is heated to 20, 40, 60, and 80 degrees Celsius for 10 minutes. (1)

Calculations:

Part A – calculation of blank titration:

$V(S_2O_3^{2-}) = 0.02925$

$n(S_2O_3^{2-}) = 0.0511 \times 0.02925 = 1.49 \times 10^{-3}$

$n(I_2 \text{ total}) = ½ \times 1.49 \times 10^{-3} = 7.47 \times 10^{-4}$

Part B – calculation of back titration:

20°C

$n(I_2) = 7.47 \times 10^{-4}$

$n(S_2O_3^{2-}) = 0.01 \times 0.0182$ $n(S_2O_3^{2-}) = 1.82 \times 10^{-4}$

$n(I_2 \text{ remaining}) = ½ \times 1.82 \times 10^{-4} = 0.91 \times 10^{-4}$ (2)

$n(I_2 \text{ reacted with vit C}) = n(I_2 \text{ remaining}) = 7.47 \times 10^{-4} - 0.91 \times 10^{-4} = .656 \times 10^{-4}$ mol = n(vitamin C)

$c(\text{vitamin C}) = n/V = .656 \times 10^{-4} / 0.1 = 0.656 \times 10^{-3}$

Conclusion:

As the temperature is increased the volume of thiosulfate needed increases. (3)