

NEATH PORT TALBOT COLLEGE COLEG CASTELL NEDD PORT TALBOT

School of Maths & Science Science Practical

Standardisation of Potassium Manganate (VII) By Titration with Sodium Ethanedioate

◆ Aim

To standardise a solution of potassium manganate (VII)

◆ Introduction

Potassium manganate (VII) is not suitable for a primary standard and therefore a solution of potassium manganate (VII) needs to be standardised before use. A suitable primary standard is sodium ethanedioate.

In the titration the end point can be detected by watching for a permanent pink tinge. This occurs when MnO_4^- is in slight excess (i.e. All the ethanedioate has been oxidised). Potassium manganate (VII) acts as its own indicator.

◆ Safety



Control Measures

- The wearing of **safety glasses** and a **laboratory coat at all times** will be sufficient to take account of most hazards and significant risks.
- You are reminded of the need of good laboratory practice in order to maintain a safe working environment.



Hazards

Corrosive

Sulfuric acid



Harmful/ Irritant

Sulfuric acid, sodium ethanedioate,
Potassium manganate (VII)



Oxidising

Potassium manganate (VII)

◆ Procedure

1. Weigh out accurately about 1.7 g of the dry sodium ethanedioate into a small beaker and then make up to 250 cm³ in a volumetric flask in the normal way.
2. Pipette 25 cm³ of this into a conical flask and add 150 cm³ of approx 1 mol dm⁻³ sulfuric acid.
3. Carry out the titration in the normal way until you see the first pink colour appear throughout the solution.
4. Now warm this solution to 50-60 °C and continue the titration to the first faint pink tinge.

◆ Questions

1. Calculate the concentration of the ethanedioate ion.
2. Write a half equation for the reduction of MnO₄⁻.
3. Write a half equation for the oxidation of C₂O₄²⁻.
4. Deduce the redox equation for the reaction of MnO₄⁻ with C₂O₄²⁻.
5. Determine the concentration of potassium manganate (VII).
6. Explain why an indicator was not needed in this titration.