

Revised September 2004



AP LAB 5b: A REDOX titration

Aim To standardize a 0.025M (approx.) solution of potassium manganate (VII)

Apparatus Pipet, pipet filler, buret, distilled water bottle, 250. mL volumetric flask, weighing boat, Erlenmeyer flask, spatula

Chemicals Distilled water, 0.025 M (approx.) potassium manganate (VII) solution, hydrated iron (II) ammonium sulfate crystals ($\text{FeSO}_4(\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$), 0.5 M sulfuric acid.

Method

Part A: Preparing the standard solution

1. Place a weighing boat on the balance and record the mass.
2. Use the spatula and the weighing boat to weigh accurately, about 2.50 g of hydrated iron (II) ammonium sulfate crystals. Record the exact mass.
3. Using great care, quantitatively transfer the entire solid to the volumetric flask using the wash bottle and the funnel.
4. Add approximately (the exact amount is NOT crucial) 50.0 mL of sulfuric acid to the solid in the volumetric flask, replace the stopper and gently shake the flask to dissolve the solid.
5. When the entire solid has dissolved, make up to the mark with distilled water taking great care when approaching the mark. Near the mark, add distilled water drop by drop using a teat pipet.

Part B: The titration

1. Pipet exactly 25.0 mL of the iron (II) ammonium sulfate solution into an Erlenmeyer flask.
2. Using the funnel, carefully fill the buret with the potassium manganate (VII) solution, noting the initial reading. Record buret readings to two decimal places, where the second figure is either a zero (exactly on a graduation) or a five (between graduations).
3. Carefully add potassium manganate (VII) to the Erlenmeyer flask from the buret with swirling.
4. Add the potassium manganate (VII) solution drop by drop near the end point. The end point is the appearance of the first permanent pink color.
5. Record the final buret reading.
6. Repeat as necessary until you have three consistent results.

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Results

Part A

Mass of weighing boat + solid in g	
Mass of weighing boat in g	
Mass of solid added in g	

Part B

	Titrations					
	Rough	1	2	3	4	5
Final burette reading in mL						
Initial burette reading in mL						
Volume added in mL						

Average Volume = _____ mL

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Conclusion/Calculation

Part A

Using the results table in Part A, calculate the precise concentration (molarity) of the standard iron (II) ammonium sulfate solution.

Part B

Using the results table in Parts A & B, and the fact that manganate (VII) ions are strong oxidizing agents that are converted to Mn^{2+} when in acid solution, calculate the precise concentration of the potassium manganate (VII) solution.