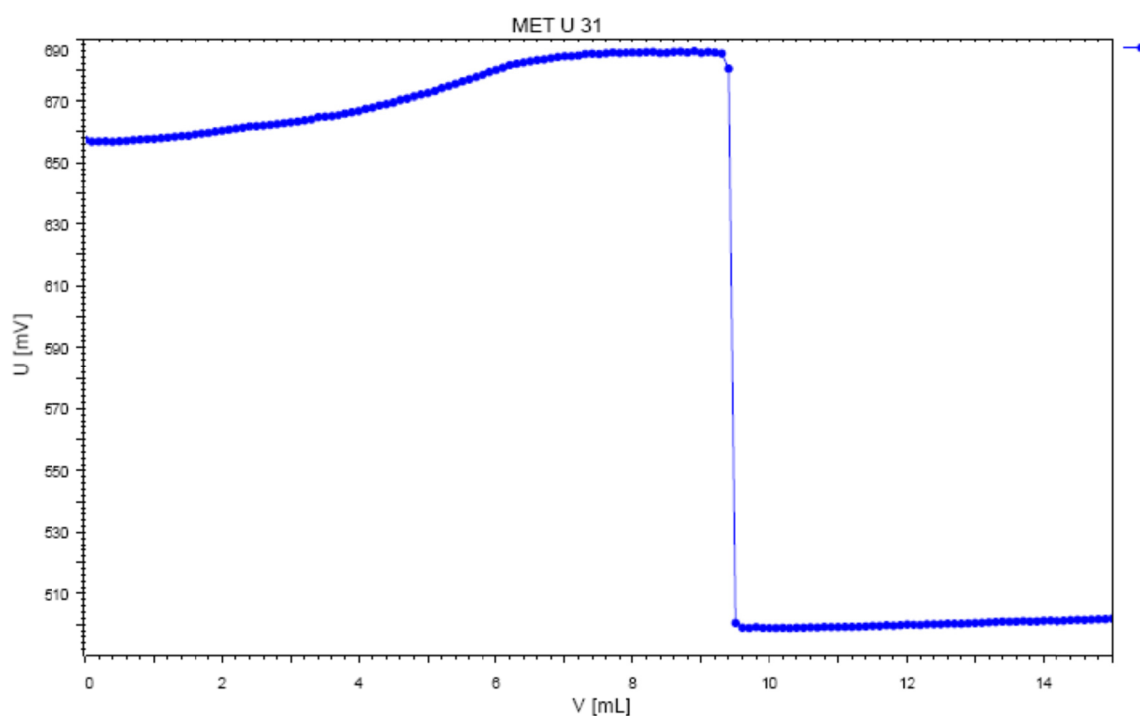


Titration Application Note T-89

Photometric EDTA titration of manganese sulfate according to Ph. Eur. and USP



This Application Note looks at the photometric determination of manganese sulfate using the Optrode (610 nm). Manganese is titrated with EDTA; Eriochrome Black T is used as indicator. The method complies with Ph. Eur. and the USP.

Method description

Sample

Manganese sulfate

Sample preparation

No sample preparation required

Configuration

907 Titrand	1 x 2.907.0010
800 Dosino	3 x 2.800.0010
Dosing unit 10 mL	1 x 6.3032.210
Dosing unit 20 mL	1 x 6.3032.220
Dosing unit 50 mL	1 x 6.3032.250
802 Rod Stirrer	1 x 2.802.0020
815 Robotic USB SP	1 x 2.815.0110
Sample beaker 250 mL	1 x 6.1432.320
Sample rack 28 x 250 mL	1 x 6.2041.820
Optrode (at 610 nm)	1 x 6.1115.000

Solutions

Titration $c(\text{Na}_2\text{EDTA}) = 0.1$ mol/L	Dissolve 37.224 g $\text{Na}_2\text{EDTA} \cdot 2\text{H}_2\text{O}$ in dist. water, add 10 mL $c(\text{NaOH}) = 1$ mol/L and make up to 1 L with dist. water.
Ascorbic acid	CAS 50-81-7
Eriochrome black T CAS 1787-61-7	Dilute 100 mg Eriochrome Black T in 100 mL dist. water.
$\text{NH}_3/\text{NH}_4\text{Cl}$ Buffer solution pH 10	Dissolve 54 g NH_4Cl and 300 mL $w(\text{NH}_3) = 25\%$ in dist. water and make up to 1 L.

Analysis

Weigh approx. 0.150 g sample into the titration beaker and dissolve in 50 mL dist. water. Add approx. 0.1 g ascorbic acid, 10 mL $\text{NH}_3/\text{NH}_4\text{Cl}$ buffer, and 0.15 mL Eriochrome Black T color indicator and titrate with $c(\text{Na}_2\text{EDTA}) = 0.1$ mol/L past the first endpoint.

Parameters

Titration mode	MET U
Measurement drift	50 mV/min
Min. waiting time	0 s
Max. waiting time	26 s
Volume increment	0.1 mL
EP criterion	30 mV
EP recognition	greatest
Stirring speed	8

Calculations

$$\% \text{MnSO}_4 \cdot \text{H}_2\text{O} = \text{EP1} \times \text{C01} \times \text{C02} \times 100/\text{C00}$$

EP1 = titrant consumption in mL

C00 = sample weight in mg

C01 = 16.902 mg/mL (1 mL $c(\text{Na}_2\text{EDTA}) = 0.1$ mol/L corresponds to 16.902 mg $\text{MnSO}_4 \cdot \text{H}_2\text{O}$)

C02 = titer Na_2EDTA (dimensionless unit)

Results

$w(\text{MnSO}_4 \cdot \text{H}_2\text{O})$ in %	
99.19 ± 0.196 (n = 6)	