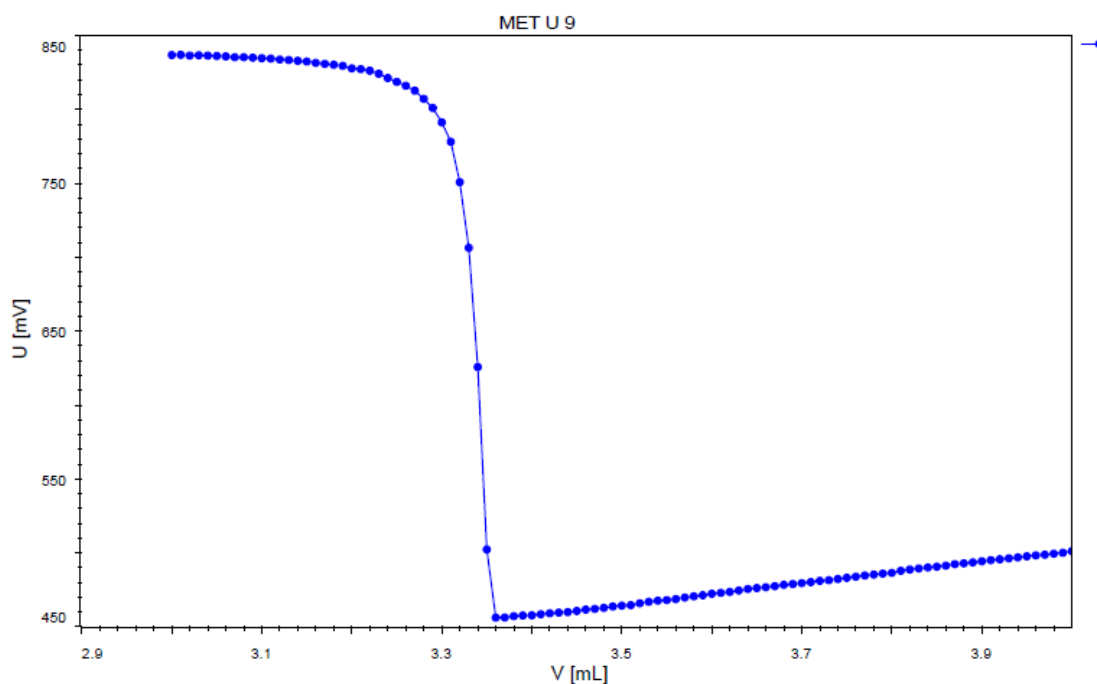


Titration Application Note T-82

Determination of nickel by photometric titration



This Application Note describes the photometric determination of nickel by using the Optrode (520 nm). Murexide was used as indicator and EDTA as titrant.

Method description

Sample

Nickel(II) sulfate hexahydrate

Sample preparation

No sample preparation required

Configuration

907 Titrand	1 × 2.907.0010
800 Dosino	5 × 2.800.0010
Dosing unit 2 mL	2 × 6.3032.120
Dosing unit 5 mL	1 × 6.3032.150
Dosing unit 10 mL	1 × 6.3032.210
Dosing unit 50 mL	1 × 6.3032.250
802 Rod Stirrer	1 × 2.802.0020
815 Robotic USB SP	1 × 2.815.0110
Sample beaker 250 mL	1 × 6.1432.320
Sample rack 28 × 250 mL	1 × 6.2041.820
Optrode (at 520 nm)	1 × 6.1115.000
Unitrode with Pt1000	1 × 6.0258.600
Electrode cable	1 × 6.2104.600

Solutions

Titrand c (Na ₂ EDTA) = 0.1 mol/L	Dissolve 37.224 g Na ₂ EDTA·2H ₂ O in dist. water, add 10 mL c(NaOH) = 1 mol/L and make up to 1 L with dist. water.
NH ₃ /NH ₄ Cl buffer solution pH 10	Dissolve 54 g NH ₄ Cl and 300 mL w(NH ₃) = 25% in dist. water and make up to 1 L.
Murexide CAS 3051-09-0	Dilute 50 mg murexide in 100 mL dist. water.
Nickel(II) sulfate hexahydrate in dist. water (g/L)	Std. 1 β(Ni ²⁺) = 4.47 50 mL of this solution were prepared.

Analysis

Add x mL of sample solution in the titration vessel, add 100 mL of dist. water, and 10 mL buffer solution. Add 1 mL of indicator solution before titration and titrate with c(EDTA²⁻) = 0.1 mol/L (monotonic equivalence point titration, MET).

Parameters

Titration mode	MET U
Measurement drift	50 mV/min
Min. waiting time	0 s
Max. waiting time	26 s
Volume increment	0.05 mL
EP criterion	30 mV
EP recognition	greatest
Stirring speed	8

Calculations

$$\text{g/L Ni}^{2+} = \text{EP1} \times \text{C01} \times \text{C02} \times \text{C03/C00}$$

EP1 = titrant consumption in mL

C00 = sample weight in mL

C01 = concentration of the EDTA titrant in mol/L

C02 = titer Na₂EDTA (dimensionless unit)

C03 = molecular weight Ni in g/mol (58.71)

Results

Ni ²⁺ in g/L	
4.45 ± 0.003 (n = 6)	