

Determination of Fe^{3+}

CHEMICAL SERIES



Introduction

Iron (III) forms a very stable complex with EDTA even at low pH values. So a titration of Fe^{3+} next to other metal ions is possible with EDTA at pH 2. A platinum electrode can be used as an indicator electrode, since the redox potential of the Fe (III) EDTA complex differs significantly from that of the free Fe^{3+} ions.



a xylem brand

Instrument
TL 5000 or higher
Magnetic stirrer TM 235 or similar

Electrode, Cable, and Electrolyte
PT 62 Electrode
L 1 A Cable

Lab Accessories
Erlenmeyer flask 100 ml with stopper
Magnetic Stirrer Bar 30 mm



Reagents	
1	Na ₂ EDTA - solution 0.1 mol/L
2	Hydrochloric acid 1 mol/L
3	Citric acid monohydrate
4	Sodium chloride
5	Electrolyte solution L3004 (for Pt 62)
6	Distilled water

All reagents should be in analytical grade or better.

Titration Procedure

Reagents

EDTA - solution 0.1 mol/L

EDTA - solution 0.1 mol/L is also available as ready-to-use solution.

Buffer solution pH 2

6.5g Citric acid monohydrate, 3.6g NaCl and 8.0 mL HCl 1 mol/L are dissolved in dist. water and made up to about 950 mL. The pH is adjusted to pH 2.0 and the solution is made up to 1.0 L.

Cleaning and Storage of the Electrode

The electrode is rinsed with distilled water. The electrolyte solution L300 is suitable for storage of the Pt 62.

Sample Preparation

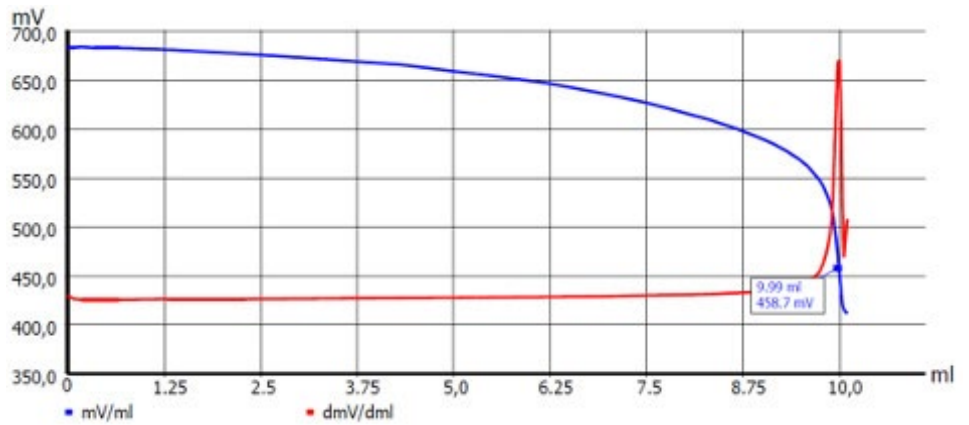
The sample is pipetted into a 150 mL beaker and dissolved in dist. water. 10 mL buffer solution pH 2 are added and the mixture is made up to 80 mL with dist. water. If the pH value deviates significantly from pH 2, the pH value must be adjusted to pH 2 with a little acid or base.

The solution is titrated with EDTA 0.1 mol/L to an equivalence point.

The required sample amount can be estimated according to this rule of thumb:

$$V(\text{mL}) = \frac{580 * \text{Titer} \left[\frac{\text{mol}}{\text{L}} \right]}{\text{expected Fe - content} [\text{g/L}]}$$

Titration parameter



APPLICATION NOTE XA00153

Default Method -			
Method type	Automatic Titration		
Mode	Dynamic		
Measured Value	mV		
Measuring Speed / Drift	Individual	Minimum Holding Time	2 s
		Maximum Holding time	15 s
		Measuring Time	2 s
		Drift	10 mV/min
Initial Waiting Time	5 s		
Dynamic	Steep	Max Step Size	1.0 ml
		Slope Max ml	10
		Min. Step Size	0.02 ml
		Slope Min. ml	230
Damping	None	Titration Direction	Increase
Pretitration	Off	Delay Time	0 s
End Value	Off		
EQ	On (1)	Slope Value	700
Max. Titration Volume	20 ml		
Dosing Speed	100%	Filling Speed	30 s

Calculation: $Fe [g/L] = \frac{(EQ1 - B) * T * M * F1}{V * F2}$

B	0	Blank value
EQ1		Consumption of Titrant until First Equivalence Point
T	WA	Actual Concentration of the Titrant
M	55.845	Molecular weight
V	man	Sample Volume in mL
F1	1	Conversion Factor
F2	1	Conversion Factor

YSI, a Xylem brand
1725 Brannum Lane
Yellow Springs, OH 45387

+1.937.767.7241
titration.yesi@xylem.com
YSI.com



YSI.com/Titration