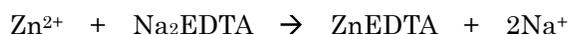


AQUACOUNTER Application Sheet	COM series	DATA No. G1	1st edition
Metal		Quantification of zinc ion (Zn²⁺)	

1. Measurement outline

Zinc ion (Zn²⁺) can be quantified easily by chelate titration. The pH range in which titration of zinc is possible with EDTA is wide (pH4.5 – 10), and there are many indicators with large stability constants against EDTA and sensitive color change. This section introduces an example in which the sample solution was adjusted to approximately pH5.3 for photometric titration with EDTA solution using XO indicator (red purple → yellow).



2. Reagents and Electrodes

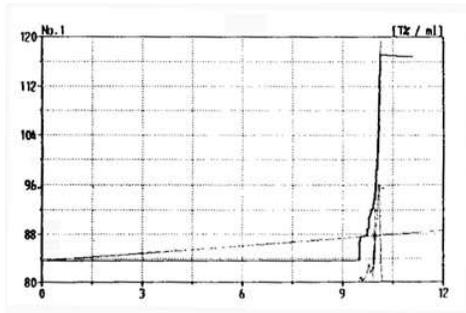
(1) Reagents	Titrant	0.01mol/L EDTA titrant
	Buffer	5mL pH5 – 5.3 acetic acid buffer
	Indicator	1.5mL XO indicator (0.05% aqueous solution)
(2) Electrodes	Photometric probe with 530 nm filter	

3. Measurement conditions example (for COM-1600M w/ Photometric unit)

Master File No.1	
Condition file: 1	
Method	F Cross
Amp No.	2
Buret No.	1
Meas Unit	T%
S-Timer	10 sec
CP	9.5 mL
DP	0 mL
End Sens	1500
Over mL	0 mL
Max Vol	20 mL
Mode No.	20
Unit	mmol/L
Blank	0
Factor	Titer of the titrant
Molarity	0.01
K	0
Formula	F×D×10 /S

Mode No.20	
Pre Int	0 sec
Del K	9
Del Sens	0 mV
Int Time	3 sec
Int Sens	3 mV
Brst Speed	2
Pulse	20

4. Measurement example



Measurement results on Zn²⁺

Sample No.	Sample volume (mL)	Titration value (mL)	Concentration (mmol/L)
1	10	9.943	9.943
2	10	9.948	9.948
3	10	9.940	9.940
4	10	9.951	9.951
5	10	9.932	9.932
6	10	9.938	9.938
Avg. (Average value)			9.942 mmol/L
Std. Dev. (Standard deviation)			0.007 mol/L
C.V. (Coefficient of variation)			0.1 %

5. Outline

There are titration methods with various indicators and pH ranges for chelate titration of zinc ion.

(1) Indicators

Besides the XO indicator (which can be used in acidic condition as well) used in this section, BT indicator (red → blue) is another popular indicator used on the alkaline side. The pH range that can be used is pH7 – 10. Color change for indicator is inhibited when there are Cu²⁺, Co²⁺ or Ni²⁺.

(2) Interfering ions

The measurement in this section is not interfered even when there are alkaline metals in a small amount. Ni²⁺, Fe³⁺, and Al³⁺ inhibit the color change for the indicator. It is not inhibited by a small amount of Al³⁺ since its reaction is slow. Since Cu²⁺ interferes, it can be masked by urea or sodium thiosulfate. A similar analysis is No. E8 of this data.

Key words

Quantification of zinc (Zn²⁺), chelate titration, XO indicator

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