AQUACOUNTER Application Sheet	COM series	DATA No. G5	1st edition

Metal — Quantification of ferric ion (Fe^{3+}) when chromic anhydride is contained

1. Measurement outline

Ferric ion is quantified in acidic solution containing chromic anhydride (CrO_3 --- hexavalent chromium) and ferric ion (Fe^{3+}).

Ferric ion reacts quantitatively with EDTA. On the other hand, Cr^{6+} and Cr^{3+} exist as chromium ions and they react quantitatively with EDTA. Only Cr^{3+} is quantified by chelate titration, however, the reaction between Cr^{3+} and EDTA rarely occurs under room temperature (heating and boiling required). Thus it does not interfere with the chelate titration of ferric ion. This section introduces an example in which ferric ion was titrated directly with EDTA after adjustment.

$$Fe^{3+} + Na_2EDTA \rightarrow FeEDTA + 2Na^{+}$$

2. Reagents and Electrodes

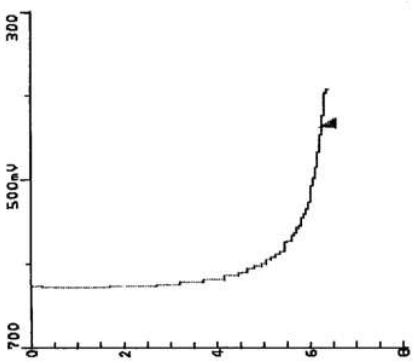
(1) Reagents	Titrant	0.1mol/L EDTA titrant
	Buffer	Ammonia water (1+1) for adjustment to pH2.5 – 3
	Indicator	0.2mL 2% salicylic acid ethanol solution used
(2) Electrodes	Photometric probe with 530 nm filter	

3. Measurement conditions example (for COM-1600M)

Master File No.1 Condition file: 1	
Method	AUTO
Amp No.	2
Buret No.	1
Meas Unit	mV
S-Timer	10 sec
CP	0 mL
DP	0 mL
End Sens	500
Over mL	0 mL
Max Vol	30 mL
Mode No.	5
Unit	g/L
Blank	0
Factor	Titer of the titrant
Molarity	0.1
K	126.75
Formula	(D-B)×K×F×M/S

Mode No.5	
Pre Int	0 sec
Del K	5
Del Sens	0 mV
Int Time	3 sec
Int Sens	3 mV
Brt Speed	2
Pulse	40

4. Measurement example



Measurement results on Fe3+

Sample No.	Sample volume (mL)	Titration value (mL)	Concentration (g/L)
1	5	6.2174	6.9990
2	5	6.0950	6.8612
3	5	6.2179	6.9995
	Avg.		6.9532 g/L
	Std. Dev.		0.08 g/L
	C.V.		1.2 %

5. Outline

As the quantification method for Fe^{3+} in mixed solution of Cr^{3+}, Cr^{6+} and Fe^{3+}, this method is the most suitable one, which quantifies by applying the fact that the chromium ion does not react with EDTA under room temperature.

Key words

Ferric ion, chelate titration, masking of chromium ion

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