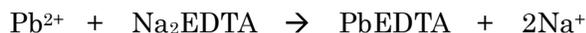


AQUACOUNTER Application Sheet	COM series	DATA No. G9	1st edition
Metal		Quantification of lead ion (Pb²⁺)	

1. Measurement outline

Chelate titration is most popularly used as the general quantification method for lead ion. The pH range in which lead ion can be titrated directly is pH3.5 – 10 (stability constant = 17.88). However, it forms precipitate of Pb(OH)₂ in alkaline range, and it is necessary that adjuvant complexing agent such as ethanolamine, tartaric acid or citric acid to prepare weak chelate compound and prevent precipitation of hydroxide when it is titrated in alkaline condition. To titrate in acidic range, it is conducted at around pH4 – 5. This section introduces an example of lead ion quantification with XO indicator (red purple → yellow) by adding hexamine aqueous solution to adjust to pH of approximately 5.



2. Reagents and Electrodes

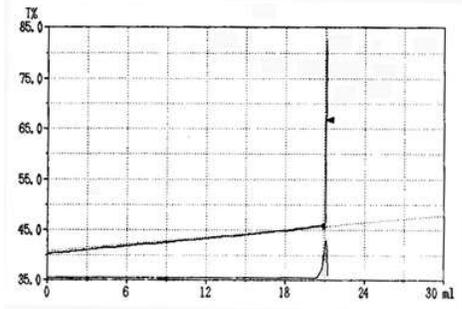
(1) Reagents	Titrant	0.01 mol/L EDTA titrant
	Buffer	10mL 20% hexamine aqueous solution for 1 measurement
	Indicator	0.1mL XO indicator (0.1% ethanol solution) for 1 measurement (Red purple → yellow)
(2) Electrodes	Photometric probe with 530 nm filter	

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	0 sec
CP	0 mL
DP	0 mL
End Sens	1000
Over mL	0 mL
Max Vol	30 mL
Mode No.	20
Unit	g/L
Blank	0
Factor	Titer of the titrant
Molarity	0.01
K	207.2
Formula	(D-B)×K×F×M/S

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

4. Measurement example



Measurement results on lead ion (Pb²⁺)

Sample No.	Sample volume (g)	Titration value (mL)	Concentration (g/L)
1	2.0435	20.683	21.0553
2	2.0688	20.940	21.0563
3	2.0671	20.901	21.0343
4	2.0482	20.687	21.0111
Avg.			21.0393 g/L
Std. Dev.			0.021 g/L
C.V.			0.10 %

5. Outline

About interfering ions

It does not interfere with measurement even when alkaline-earth metals or Mg coexist in the pH range of this method. However, caution is required since Fe³⁺, Ni²⁺, Zn²⁺, Cd²⁺, Co²⁺, etc. will be titrated at the same time.

Key words

Chelate titration, lead ion, XO indicator, hexamine

Hitachi High-Technologies Corporation

Head Office 1-24-14, Nishishinbashi, Minato-Ku, Tokyo 105-8717, Japan

Tel : 81-3-3504-7239 Fax : 81-3-3835-7302

<http://www.hitachi-hitech.com>

Hiranuma Sangyo Co.,Ltd.

1739, Motoyoshidacho, Mito-City, Ibaraki 310-0836, Japan

Tel : 81-29-247-6411 Fax : 81-29-247-6942

<http://www.hiranuma.com>