

AQUACOUNTER Application Sheet	COM series	DATA No. J9	1st edition
Inorganic Acid		Successive quantification of cyanide and cyanic acid in metal treatment salt	

1. Measurement outline

Cyanide and cyanic acid contained in metal treatment salt are quantified in successive titration by precipitation titration. This section introduces a measurement example in which the sample is dissolved in purified water with addition of calcium nitrate in advance since it is solid. Then sodium carbonate is added to form precipitation, followed by methanol addition for potentiometric titration with silver nitrate titrant.



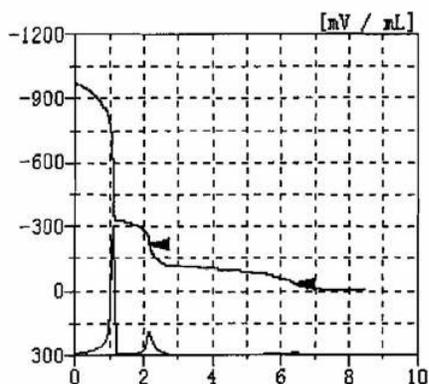
2. Reagents and Electrodes

(1) Reagents	Titrant	0.2 mol/L AgNO ₃ titrant
	5% calcium nitrate aqueous solution; Approximately 10mL used for 1 measurement	
	Methanol; Approximately 20mL used for 1 measurement	
(2) Electrodes	Indicator electrode	Silver indicator electrode AG-311 to IE jack (P/N E231245-A)
	Reference electrode	Silver reference electrode MS-231 to RE jack (P/N D231243-A)

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

(1) Method	Auto	
(2) End Sens	120 (HCN)	50 (HCNO)
(3) Mode	5	
Pre Int	0	
Del K	5	
Del Sens	0	
Int Time	3	
Int Sens	3	
Brt Speed	2	
Pulse	40	

4. Measurement example



Measurement results on cyanide

Sample No.	Sample volume (g)	Titration value (mL)	Concentration (%)
1	0.2194	0.572	1.369
2	"	0.563	1.347
3	"	0.548	1.311
Avg.			1.340 %
Std. Dev.			0.03 %
C.V.			2.16 %

Measurement results on cyanic acid

Sample No.	Sample volume (g)	Titration value (mL)	Concentration (%)
1	0.2194	8.164	31.55
2	"	8.147	31.49
3	"	8.167	31.56
Avg.			31.53 %
Std. Dev.			0.04 %
C.V.			0.13 %

5. Outline

(1) About methanol addition

In this measurement, measurement precision was improved by adding the methanol to reduce the solubility of silver cyanate.

(2) About removal of interference by carbonate salt

In many cases, metal treatment salt contains sodium carbonate in a large quantity. Since the carbonate salt interferes with precipitation titration in alkaline conditions, it was precipitated by adding calcium nitrate before titration.

Key words

Cyanide, cyanic acid, precipitation titration

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>