HIRANUMA APPLICATION DATA	Automatic Titrator	Data No.	G10	Apr. 5,2019

Metals	Quantitative determination of copper ion in plating solution

1.Abstract

The photometric titration using a photometric probe is generally applied for the determination of copper ion (Cu2+). However, the measurement of cloudy or colored sample has difficulty to analyze with the photometric titration. The measurement using copper ion-selective electrode performs the potentiometric titration which it is not affected by the suspended particle and the indicator reagent is not required for the titration.

$$Cu^{2+} + Na_2EDTA \rightarrow Cu\text{-}EDTA + 2Na^{2+}$$

This report introduces an example of the measurement for copper ion in plating solution with chelatometric titration using copper ion-selective electrode.

2. Configuration of instruments and Reagents

(1) Configuration of instruments

Main unit	:	Hiranuma Automatic Titrator COM series
Electrodes	:	Copper ion-selective electrode CUi-081
		Reference electrode RE-201Z

(2)Reagent

Titrant	:	0.1 mol/L EDTA standard solution
Buffer solution	:	Sodium acetate- acetic acid buffer pH 5
		Dissolve 13.6 g of sodium acetate in DI water and prepare 100 mL (1 mol/L)
		of the solution. Adjust the pH to 5 by adding acetic acid.

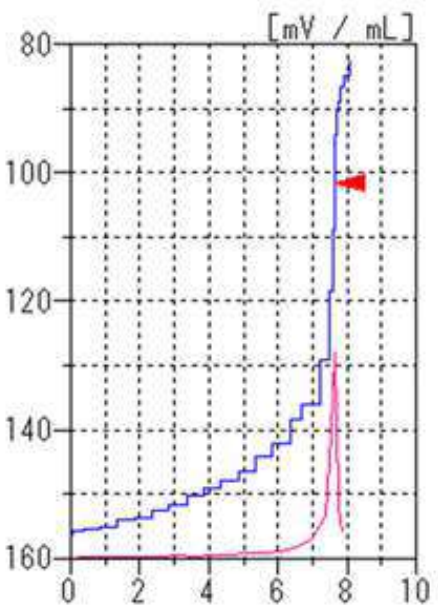
3. Measurement procedure

(1) Dispense 5 mL of sample into a 100 mL beaker with volumetric pipette.
(2) Add about 50 mL of DI water.
(3) Add 5 mL of buffer solution with micropipette.
(4) Immerse electrode into sample solution and titrate with 0.1 mol/L EDTA standard solution.

4. Measurement conditions and results

Examples of titration conditions

Amp No.	2		Blank	0	mL	Mode No.	8	
D. Unit	mV		Molarity	0.1	mol/L	Pre Int	0	sec
S-Timer	10	sec	Factor	0.995		Del K	5	
C.P. mL	0	mL	K	63.54		Del Sens	0	mV
T.Timer	0	sec	L	0		Int Time	5	sec
D.P. mL	0	mL	Unit	g/L		Int Sens	3	mV
End Sens	100		Formula			Brt Speed	2	
Over mL	1	mL		(D-B)*K*F*M/S		Pulse	40	
Max.Vol.	20	mL	Decimal Places	3				
			Auto input parameter	None				



Example of titration curve

Measurement results

Number of measurement	Size (mL)	Titrant volume(mL)	Concentration (g/L)
1	5	7.623	9.639
2	5	7.603	9.614
3	5	7.622	9.638
4	5	7.611	9.624
5	5	7.595	9.603
Statistic calculation		Average	9.62 g/L
		Standard deviation	0.02 g/L
		Coefficient of variation	0.16 %

5. Note

The reading of the potential might decrease with repeated use of the copper ion-selective electrode. Polishing the surface of the copper ion-selective electrode with a fine sandpaper (P800 or finer) improves the condition of the electrode.

Keywords: Copper ion, Potentiometric titration, Copper ion-selective electrode, Plating solution, Chelatometric titration

*Some measurement would not be possible depending on optional configuration of system.

Address:1739 Motoyoshida,Mito,Ibaraki,310-0836,JAPAN