

<i>HIRANUMA APPLICATION DATA</i>	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 (Cu^{2+}). 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.



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

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

(2) Reagents

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.

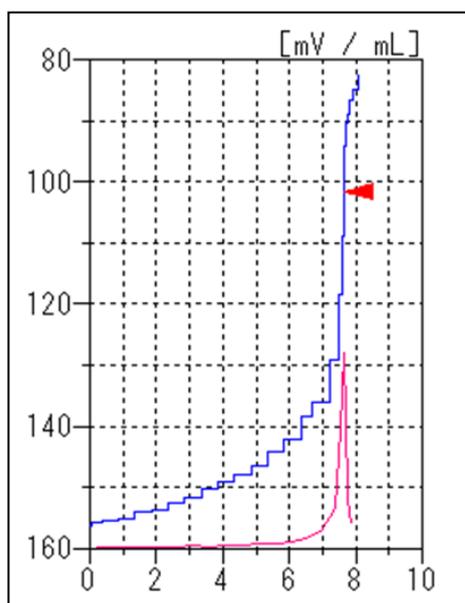
3. Measurement procedure

- (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

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



Example of titration curve

Measurement results

Number of Measurement	Size (mL)	Titrant Volume (mL)	Concentration (g/L)
1		7.623	9.639
2		7.603	9.614
3	5	7.622	9.638
4		7.611	9.624
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