

Sheet No.

**GT200-PS017**

## Nickel Content Analysis of Nickel Plating Solution 1/3

Method : Chelate titration (photometric detection)  
 Apparatus : Automatic Titrator GT-200  
                   Photometric detector GT-LDII  
                   Interference filter wavelength 620 nm  
 Titration mode : CROSS-F, Detection: mV  
 Related standard : Plating Textbook, Nikkan Kogyo Shimbun, Ltd.

\*This sheet is provided as information. It is not to guarantee the analysis values. Please use under the ideal conditions considering external factors including the analysis environment and properties of the sample.

### Outline of Measurement Outline

Nickel plating solution is used for various products mainly as first plating. Since the concentration of bath components constantly varies, analysis needs to be carried out at least once per week to maintain within the appropriate concentration ranges. Nickel content analysis of nickel plating solution is carried out by chelate titration (photometric detection).

### Equipment Configuration

[Titrant]

■0.05 mol/L EDTA solution (for volumetric analysis)

[Reagent]

■25% ammonia solution (commercial product)

[Indicator]

■MX indicator

### Analytical Procedure

- (1) Place 1 ml of sample into a 200-ml beaker using a volumetric pipette.
- (2) Add about 100 ml of pure water.
- (3) Add 10 ml of 25% ammonia solution into the beaker using a Komagome pipette.
- (4) Add 0.5 g of MX indicator and dissolve.
- (5) Titrate using 0.05 mol/L EDTA solution. (Orange → Reddish purple)

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[Equation]

**Nickel content (g/L) = (A1 - BL) × M × E × f × FW / S × R (using fixed equation)**

A1 : Titer of 0.05 mol/L EDTA solution to the end point (ml)

BL : 0

M : Molarity of 0.05 mol/L EDTA solution

E : Valence of 0.05 mol/L EDTA solution (1)

f : Factor of 0.05 mol/L EDTA solution (0.999)

FW : Atomic weight of nickel (58.6934)

R : Dilution rate (1)

### Other Requirements

- Set the initial buret suction position to 50%.
- Handle measurement reagents with care after reading through and understanding their labels and safety data sheets.
- Wear personal protective equipment such as protective goggles and gloves when handling the reagents.

### Measurement Results

	Sample amount	Titer (ml)	Measurement value (g/L)
1	1	21.1435	62.1
2		21.1429	62.1
3		21.1426	62.1

Number of data	(n)	3
Average		62.1
Standard deviation	(SD)	0.0013
Relative standard deviation	(RSD%)	0.0022

Nickel content of nickel plating solution was measured using GT-200. Average over 3 measurements was 62.1 g/L. Relative standard deviation (RSD%) was 0.002%, exhibiting measurement with relatively high reproducibility.

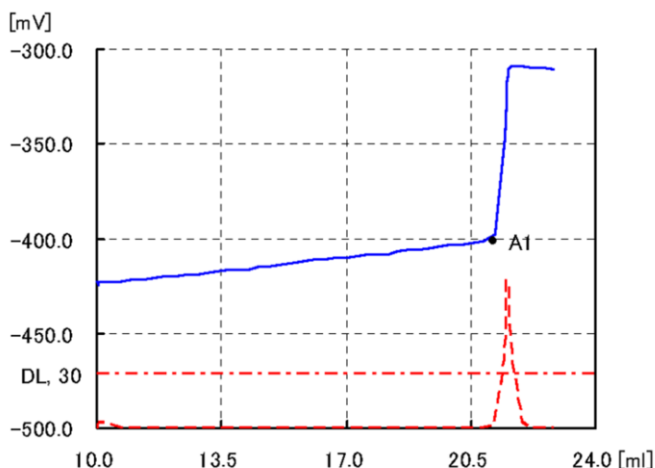
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ID No.: 65

Measurement date : 2013/09/18 11:44  
 Sample name : Ni plating solution

Measurement type : Sample Titr  
 Sample size (S) : 1 [ml]



C1: 62.109 [g/l]

A1: 21.1426 [ml] -401 [mV]

Pi : -435 [mV]  
 Start : 10 [ml] -423 [mV]  
 End : 22.818 [ml] -311 [mV] Time: 4' 55"

Run File No. : 21  
 Titration File No.: 8 Ni plating/nickel  
 Mode : CROSS-F End1 End1 Width: -350 [mV] ± 500 [mV]  
 Detect : mV1 Preset 1 Mode: V RT: 1  
 BRT No. : 1 Vol: 10 [ml]  
 Reagent : 12  
 WTint : 10 [sec]  
 Vup : 300 [ul]  
 Vlow : 20 [ul]  
 dE : 2 [mV]  
 dT : 3 [sec]  
 DL : 30 [mV/ml]  
 DetCnt : 20  
 Vmax : 30 [ml] C1: (A1-BL)\*M\*E\*\*FW/S\*R  
 Vover : 1 [ml] [g/l]

Reag : EDTA E : 1 M : 0.05 [Mol/l]  
 f : 1.001  
 FW : 58.6934 R : 1

Buret Injection Speed: 500 [ul/sec]