

<b>HIRANUMA APPLICATION DATA</b>	Automatic Titrator	Data No.	J8	Apr. 5, 2019
<b>Inorganic acid &amp; Mixed acid</b>	<b>Determination of boric acid in plating solution</b>			

## 1. Abstract

Boric acid in plating solution is determined by neutralization titration. Boric acid cannot be directly determined by neutralization titration because it is too weak acid.

This report introduces an example of the procedure that D(-)-mannitol (mannite) is added to sample solution to generate stoichiometric organic acid, and then it is titrated with sodium hydroxide standard solution.



## 2. Configuration of instruments and reagents

### (1) Configuration of instruments

Main unit : Hiranuma Automatic Titrator COM series

Electrodes : Glass electrode GE-101B

Reference electrode RE-201Z

\*Instead of the above electrodes, the following electrodes are usable.

- Glass reference combination electrode GR-501B···Fixed sleeve type
- Glass reference combination electrode GR-511B···Movable sleeve type

### (2) Reagents

Titrant : 0.1 mol/L Sodium hydroxide standard solution

Additive solution : 10 mL of 20 % mannite solution

## 3. Measurement procedure

(1) Dispense 1 mL of sample into a 100 mL beaker with volumetric pipette.

(2) Add 50 mL of DI water.

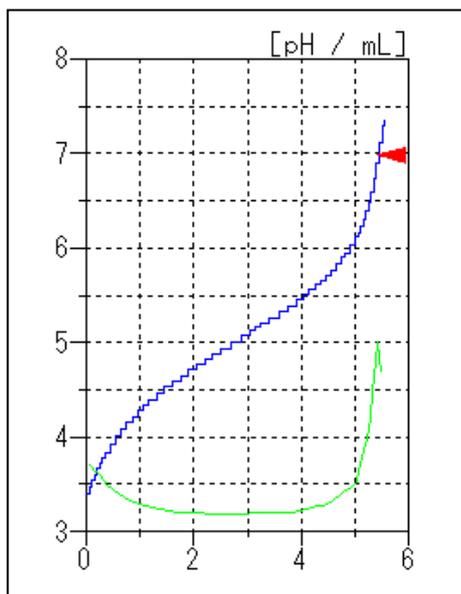
(3) Add 10 mL of 20 % mannite solution.

(4) Immerse electrodes and start titration with 0.1 mol/L sodium hydroxide standard solution.

## 4. Measurement conditions and results

### Example of titration condition

¥Cndt No.	1	ConstantNo.	1	Mode No.	5
Method	Auto	Size	1.000 mL	Pre Int	0 sec
Buret No.	1	Blank	0.000 mL	Del K	5
Amp No.	1	Molarity	0.100 mol/L	Del Sens	0 mV
D. Unit	pH	Factor	1.001	Int Time	3 sec
S-Timer	5 sec	K	61.83	Int Sens	3 mV
C.P. mL	0 mL	L	0.000	Brt Speed	2
T Timer	0 sec	Unit	g/L	Pulse	40
D.P. mL	0 mL	Formula	(D-B)*K*M/S		
End Sens	500	Decimal Places	4		
Over mL	0 mL	Auto In Pram.	Non		
Max. Vol.	20 mL				



Example of titration curve

### Measurement results

Number of Measurement	Size (mL)	Titrant Volume (mL)	Boric acid Concentration (g/L)
1	1	5.419	33.539
2	1	5.463	33.812
3	1	5.420	33.545
		Avg.	33.6 g/L
Statistic calculation		SD	0.155 g/L
		RSD	0.46 %

## 5. Note

### • Interference substance on measurement

#### 1) Samples containing some acids

After it is titrated to the endpoint pH, add mannitol solution and start titration when the sample contains some acids.

#### 2) Samples containing some metallic salts

This method is sometimes inapplicable for the sample containing some metallic salts like iron which react with sodium hydroxide and generate precipitates.

Keywords: Boric acid, D(-)-mannitol, Neutralization titration