KEM Application Note No. ETIQ-05092

Oxidation-Reduction Titration

Kyoto Electronics Manufacturing Co., Ltd.

Data No. NZ15-05048

Determination of copper ion (Cu^{2+}) in etchant (Oxidation reduction method)

-Summary-

Checked the possibility of measuring copper ion in etchant with AT-510, and good repeatability was obtained.

-Measuring instrument-

Main unit: AT-510 Automatic potentiometric titrator

Preamplifier: STD-510 Standard preamplifier

Electrode: C-272 Combined glass electrode

-Reagent-

Titrant: 0.1mol/L-Sodium thiosulfate solution

Solvent: distilled water

Additive: Acetic acid, 10%-Ammonium acetate, Potassium iodine

-Measurement method-

Preparation:

(1) Dissolve Ammonium acetate in water to prepare 10%-Ammonium acetate.

Measurement:

(1) Place 2.0mL of the sample in 100mL beaker and add 50mL of distilled water.

(2) Add 4mL of Acetic acid and 5mL of 10%-Ammonium acetate.

(3) Add 3g of Potassium iodine and dissolve it completely.

(4) Titrate with 0.1mol/L-Sodium thiosulfate solution.

(EP is detected from the inflection point on the titration curve.)

-Calculation-

Concentration (g/L)=(EP1-BL1)×TF×C1×K1/SIZE

EP1: Volume at EP (mL) BL1: Blank volume (mL) TF: Factor of titrant

C1: Conc. conversion coefficient (6.354) (1mL of 0.1mol/L-$Na_2S_2O_3$ ≡ 6.354mg Cu)

K1: Unit conversion coefficient (1) SIZE: Sample size (mL)

-Ambient conditions-

Temperature: 23.2 °C R. Humidity: 71% Weather: Rain

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-Measurement parameter-

[Titration Parameter]

Method No. 35
<Auto Titration>
Method Type : Titration

< Titration >
Form : EP STOP
APB No. : 1
Unit No. : 1
Detector No. : 1
Unit : mV
Max. Volume : 40.0mL
Wait Time : 0s
Direction : Auto

< Control >
End Point No. : 1
End Sense : Auto
End Point Area : Off
Separation : Off
Over Titr. Vol. : 0.0mL
Gain : 1
Data Samp. Pot.: 4.0mV
Data Samp. Vol. : 0.5mL
Control Speed: Medium

< Calculation >
Calc. Type : Sample
Conc. 1 : Set
CO1= (EP1-BL1)*TF*C1*K1
/SIZE
Unit : g/L
EP No. : 1

Conc. 2 : Off

Conc. 3 : Set
CO3= EP1
Unit :
EP No. : 1

Conc. 4 : Off
Conc. 5 : Off
Temp. Comp. : Off

< Constant >
C1(mg/mL) : 6.354
K1 : 1

-Titration curve-

Result

Sample No. : 13-01
Date : 2005/05/31 15:54

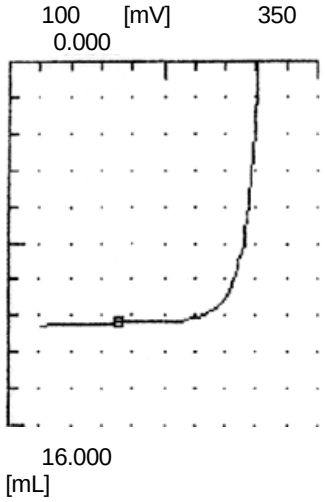
Method No. : 35
<Auto Titration>
Method Name :
Auto Titration

Init. Level : 299.8mV
Fin. Level : 125.3mV
Fin. Volume : 11.6700mL
Titr. Time : 00:03:10

Size : 2.0mL

Conc-1 36.592g/L
Conc-3 11.518

End Point-1
Volume : 11.5179mL
Potential : 188.9mV



-Measurement results-

Run	Sample size (mL)	Titer (mL)	Concentration (g/L)
1	2.0	11.5179	36.592
2	2.0	11.4465	36.366
3	2.0	11.4781	36.466

Statistics	
Mean	36.475 g/L
SD	0.1132 g/L
RSD	0.3105 %

-Comments-

Precipitation was observed when adding Potassium iodine in the sample measurements, but it did not affect the measurement results.

-Key word and entry number in Data Base -

Copper ion: 43 entries

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