KYOTO ELECTRONICS MANUFACTURING CO.,LTD.

TIQ-99433enL

Application Memo

Concentration of 43% Sodium Chlorate

Industry	Inorganic chemical industry
Instrument	Automatic potentiometric titrator
Measurement method	Redox titration
Standards	

1. Overview

43% sodium chlorate can be obtained by high temperature brine electrolysis or by blow of chlorine into hot sodium hydroxide. It is mostly used as bleaching agent for pulp.

Sodium chlorate is measured as follows: the excessive ferrous ammonium sulfate is reacted with test sample and titrate residual ferrous ammonium sulfate with potassium permanganate to obtain reacted ferrous iron from which sodium chlorate is calculated.

$$NaClO_3 + 6FeSO_4 + 3H_2SO_4 \rightarrow NaCl + 3Fe_2(SO_4)_3 + 3H_2O$$

($Fe^{2+} \rightarrow Fe^{3+}$)

$$10FeSO_4 + 2KMnO_4 + 8H_2O \rightarrow 5Fe_2(SO_4)_3 + K_2SO_4 + 2MnSO_4 + 8H_2O$$

(Residual $Fe^{2+} \rightarrow Fe^{3+}$)

Reaction with ferrous ammonium sulfate is redox reaction so that the test liquid is slowly boiled while nitrogen purged in order to avoid oxidation by ambient air.
Measurement may take time but a good results of repeatability can be obtained.

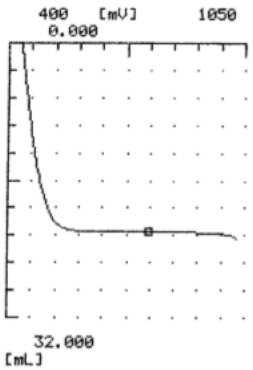
2. Apparatus

Main unit	Automatic potentiometric titrator (preamplifier STD)
Electrode	Combined platinum electrode (Internal solution: 3.33M potassium chloride)

3. Reagents

Titrant	0.02mol/L Potassium permanganate (f = 1.00)
Solvent	Water, 0.15mol/L ferrous ammonium sulfate

4. Example



—Titration curve—

—Measurement results—

	Sample (g)	Titer (mL)	Concentration (% w/w)
1	5.0042	22.0233	43.77
2	5.0042	22.0253	43.76
3	5.0042	22.0265	43.76
Average			43.76
SD			0.01
RSD(%)			0.01

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