

ICS 71.100.10
CCS H 21

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**NONFERROUS METALS INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

YS/T 273.5-2006

**Chemical analysis methods and physical properties of cryolite.
Part 5: Determination of sodium by flame atomic absorption
spectrometric method
(English Translation)**

Issued on: May 25, 2006

Implemented on: December 1, 2006

Issued by: National Development and Reform Commission of PRC

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Foreword

YS/T 273 "Chemical analysis methods and physical properties of cryolite" is divided into 13 parts.

- Part 1.Determination of moisture content - Gravimetric method;
- Part 2.Determination of ignition loss;
- Part 3.Determination of fluoride content;
- Part 4.Determination of aluminum content - EDTA titration method;
- Part 5.Determination of sodium by flame atomic absorption spectrometric method;
- Part 6.Determination of silica content by the molybdenum blue photometric;
- Part 7.Determination of iron content by orthophenanthroline photometric method;
- Part 8.Determination of sulfate content - Barium sulfate gravimetric method;
- Part 9.Determination of phosphorus pentoxide content - Molybdenum blue photometric method;
- Part 10.Determination of alumina content by gravimetric method;
- Part 11.Determination of sulphur content by X-ray fluorescence spectrometric method;

-- Part 12.The atomic absorption spectrophotometric method for the determination of calcium oxide content;

-- Part 13.Preparation and storage of test samples.

This Part is Part 5.

This part is a revision of YS/T 273.5-1994.In addition to editorial modification, two chapters on Precision AND Quality Assurance and Control have been added. Other changes include.

-- The measuring wavelength of the instrument is changed from the most sensitive

589.0 nm to the hypo-sensitive 589.6 nm;

-- The length of the working curve is shortened, and the concentration of the highest concentration standard solution in the working curve is reduced from 10.0 µg/mL to 5.00 µg/mL;

Chemical analysis methods and physical properties of
cryolite - Part 5.Determination of sodium by flame atomic
absorption spectrometric method

1 Scope

This Part specifies the method for the determination of sodium content in cryolite.

This Part applies to the determination of sodium content in cryolite. Determination range. 20%~35%.

2 Method summary

After the test portion is dissolved with sulfuric acid, it is heated to remove fluorine, and the precipitate is dissolved with hydrochloric acid and water; the sodium content of the test solution is determined at the wavelength of 589.0 nm or 589.6 nm of an atomic absorption spectrometer by the use of an air-acetylene fuel-lean flame.

3.3 Sodium standard solution. Weigh 3.089 g of anhydrous sodium sulfate that has been

dried at 120 °C and cooled in a desiccator, place it in a 250 mL beaker, and add 100 mL

of water to dissolve; then, add 10 mL of hydrochloric acid (3.2), transfer the solution to a 1000 mL volumetric flask, dilute to volume with water, mix well, and transfer it to a polyethylene bottle. 1 mL of this solution contains 1.000 mg of sodium.

4.2 Atomic absorption spectrometer. It is equipped with a sodium hollow cathode lamp.

Any instrument that can meet the following indicators under the best working conditions can be used.

-- Characteristic concentration. In a solution consistent with the matrix of the measured sample, the characteristic concentration of sodium shall not be greater than 0.07 ug/mL.

-- Precision. Use the standard solution with the highest concentration to measure the absorbance 10 times, and the standard deviation shall not exceed 1.0% of the average absorbance; use the standard solution with the lowest concentration (not the "zero" concentration standard solution) to measure the absorbance 10 times, and the standard deviation shall not exceed 0.5% of the average absorbance of the highest concentration standard solution.

-- Working curve linearity. Divide the working curve into 5 equal segments according to concentration, and the ratio of the absorbance difference in the highest segment to the absorbance difference in the lowest segment is not less than 0.85.

5 Sample

The sample shall comply with the requirements of 3.3 in YS/T 273.13.

6.1 Test portion

Weigh 0.5 g of test sample (5), accurate to 0.0001 g.

6.2 Number of determinations

Two determinations shall be carried out independently and the average value shall be taken.

6.3 Blank test

Do a blank test along with the sample test.

6.4.1 Place the test portion (6.1) in the platinum dish (4.1), add 5 mL of sulfuric acid

(3.1), and slowly dissolve it in a sand bath (15 min~20 min) to remove fluorine; then, heat it to evaporate until the thick smoke emits; remove the test portion and cool it to room temperature; add 3 mL of hydrochloric acid (3.2) and 30 mL of water, and heat in a low-temperature sand bath until all salts are dissolved. After cooling, transfer the solution to a 500 mL volumetric flask, dilute to volume with water, and mix well.

6.4.2 According to Table 1, take the test solution (6.4.1), place it in a 500 mL volumetric

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