

ICS 77.120.99
CCS H 64

YS

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

YS/T 509.1-2008

**Methods for chemical analysis of spodumene and lepidolite concentrates.
Determination of lithium oxide, sodium oxide, and potassium oxide contents.
Flame atomic absorption spectrometric method**

(English Translation)

Issued on: March 12, 2008

Implemented on: September 1, 2008

Issued by: National Development and Reform Commission of China

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Foreword

YS/T 509 "Methods for chemical analysis of spodumene and lepidolite concentrates" consists of the following 11 parts.

- Part 1.Determination of lithium oxide sodium oxide and potassium oxide contents - Flame atomic absorption spectrometric method;
- Part 2.Determination of rubidium oxide and caesium oxide contents - Flame atomic absorption spectrometric method;
- Part 3.Determination of silicon dioxide content - Gravimetric-molybdenum blue photometric method;
- Part 4.Determination of aluminum oxide content - EDTA compleximetric method;
- Part 5.Determination of ferric oxide content - O-phenanthroline photometric method and EDTA compleximetric method;
- Part 6.Determination of phosphorus pentoxide content - The molybdenum blue photometric method;
- Part 7.Determination of beryllium oxide content - Chromazurol S and cetyltrimethyl ammonium bromide spectrophotometric met;

- Part 8.Determination of calcium oxide and magnesium oxide content -
Flame atomic absorption spectrometric method;
- Part 9.Determination of fluorine content - Ion selective electrode method;
- Part 10.Determination of manganous oxide content-Persulfate oxidation
photometric method;
- Part 11.Determination of loss on ignition - Gravimetric method.

This Part is Part 1.

This Part replaces YS/T 509.1-2006 "Methods for chemical analysis of
spodumene and lepidolite concentrates The atomic absorption
spectrophotometric method for determination of lithium oxide sodium oxide and
potassium oxide contents" (previous edition is GB/T 3885.1-1983).

Compared with YS/T 509.1-2006, the main changes in this Part are as follows.

- re-edited the text format;
- added the provisions on quality assurance and control, added repetitive
clauses.

This Part was proposed by and shall be under the jurisdiction of National Non-
ferrous Metals Standardization Technical Committee.

Main drafting organization of this Part. Xinjiang Lithium Salt Factory.

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Versions of standard substituted by this Standard are.

- GB/T 3885.1-1983, YS/T 509.1-2006.

Methods for chemical analysis of spodumene and
lepidolite concentrates - Determination of lithium
oxide, sodium oxide and potassium oxide contents -
Flame atomic absorption spectrometric method

1 Scope

This Part specifies the determination methods for lithium oxide, sodium oxide and potassium oxide contents in spodumene, lepidolite concentrates.

This Part is applicable to the determinations of lithium oxide, sodium oxide and potassium oxide contents in spodumene, lepidolite concentrates.

Determination range. 3.00% ~ 8.00% for lithium oxide; 0.10% ~ 10.00% for sodium oxide, potassium oxide.

2 Method summary

The test material is decomposed with hydrofluoric acid-sulfuric acid. In a sulfuric acid medium, determine the lithium oxide, sodium oxide, and potassium oxide by using an air-acetylene gas lean burn flame at wavelengths of 670.8 nm,

3 Reagents

Unless otherwise stated, only the reagents identified as analytically pure and distilled water or water of comparable purity are used in the analysis.

3.3 Lithium standard stock solution. weigh 2.4729 g of lithium carbonate (99.9% or more) that has been previously dried at 105°C ~ 110°C for 2h and left to cool in a desiccator to room temperature. Place in a 250mL beaker. Add 80mL of water. Cover a wide-mouth bottle. Slowly add 10mL of sulfuric acid from the mouth (3.2). Heat to dissolve all lithium carbonate. Boil off carbon dioxide and cool to room temperature. Blow and wash the wide-mouth bottle with water. Transfer solution to a 1000mL volumetric flask. Dilute with water to the scale, mix well. Move into a dry plastic bottle to store. This solution contains 1.0 mg of lithium oxide per 1 mL.

3.6 Lithium oxide, sodium oxide, and potassium oxide mixed standard solution. transfer 100.00 mL of lithium standard stock solution (3.3), 100.00 mL of sodium oxide standard stock solution (3.4), 100.00 mL of potassium oxide

standard stock solution (3.5) into a 1000mL volumetric flask. Dilute to the scale with water. Move into a dry plastic bottle to save. This solution contains 100 µg of lithium oxide, 100 µg of sodium oxide, and 100 µg of potassium oxide per 1 mL.

3.7 Lithium oxide, sodium oxide, and potassium oxide mixed standard solution.

4 Instruments

Atomic absorption spectrometer with air-acetylene burner and lithium, sodium and potassium hollow cathode lamps.

5.1 Spodumene concentrate shall pass through 0.074mm mesh screen.

Lithium mica concentrate Shall pass 0.105mm sieve.

6.1 Test material

Weigh 0.10 g of specimen, to the nearest of 0.001 g.

6.2 Measurement quantity

Perform the parallel determination of two test materials. Take the average value.

6.3 Blank test

Perform the blank test accompanying with test material.

6.5.1 Pipette 0mL, 5.00mL, 10.00mL, 15.00mL, 20.00mL, 25.00mL, 30.00mL,

35.00mL of lithium oxide, sodium oxide and potassium oxide mixed standard solution (3.6) into a set of 100mL volumetric flasks, respectively.

6.5.2 Pipette 0mL, 1.00mL, 2.00mL, 3.00mL, 4.00mL, 5.00mL of mixed

standard solution (3.7) into a set of 100mL volumetric flasks, respectively. Add

7 Calculation of analysis results

Lithium oxide, sodium oxide and potassium oxide mass fraction w , in %, is calculated by.