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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 11064.16-2023

Replacing GB/T 11064.16-2013

Methods for chemical analysis of lithium carbonate, lithium hydroxide monohydrate and lithium chloride - Part 16: Determination of calcium, magnesium, copper, lead, zinc, nickel, manenases, cadmium, aluminum, iron and sulfate contents - Inductively coupled plasma atomic emission spectrometry

碳酸锂、单水氢氧化锂、氯化锂化学分析方法 第16部分：钙、镁、铜、铅、锌、镍、锰、镉、铝、铁、硫酸根含量的测定 电感耦合等离子体原子发射光谱法

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Foreword

This document was drafted in accordance with the rules given in GB/T 1.1-2020 "Directives for standardization - Part

1.Rules for the structure and drafting of standardizing documents". This document is Part 16 of GB/T 11064 "Methods for chemical analysis of lithium carbonate, lithium hydroxide monohydrate and lithium chloride". The following parts of GB/T 11064 have been issued. -

Part

1.Determination of lithium carbonate content -- Acid-alkali titrimetric method; - Part

2.Determination of lithium hydroxide content -- Acid-alkali titrimetric method; - Part

1 Scope

GB/T 11064.16-2023 is the Chinese national standard on methods for chemical analysis of lithium carbonate, lithium hydroxide monohydrate and lithium chloride - part 16: determination of calcium, magnesium, copper, lead, zinc, nickel, manganese, cadmium, aluminum, iron and sulfate contents - inductively coupled plasma atomic emission spectrometry, in the field of metallurgy. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 6 August 2023 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 March 2024. Classification: ICS 77.120.99, CCS H14. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This document describes methods for the determination of calcium, magnesium, copper, lead, zinc, nickel, manganese, cadmium, aluminum, iron, and sulfate content in lithium carbonate, lithium hydroxide monohydrate, and lithium chloride. This document is applicable to the determination of calcium, magnesium, copper, lead, zinc, nickel, manganese, cadmium, aluminum, iron, and sulfate content in lithium carbonate, lithium hydroxide monohydrate, and lithium chloride. The measurement range of each element is shown in Table 1. Table 1 -- Determination range of each element

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 6682, Water for analytical laboratory use -- Specification and test methods
Element Determination range/% Determination range/%

GB/T 8170, Rules of rounding off for numerical values and expression and judgement of limiting values

GB/T 17433, Foundation terms for chemical analysis of metallurgical products

3 Determination of lithium chloride content -- Potentiometric method; - Part

4.Determination of potassium and sodium content -- Flame atomic absorption spectrometric method; - Part

5.Determination of calcium content -- Flame atomic absorption spectrometric method; - Part

6.Determination of magnesium content -- Flame atomic absorption spectrometric method; - Part

7.Determination of iron content - 1, 10-Phenanthroline spectrophotometric method; - Part

8.Determination of silicon content -- Molybdenum blue spectrophotometric method; - Part

4 Principle

Lithium carbonate and lithium hydroxide monohydrate are decomposed with nitric acid. Lithium chloride is dissolved in water. In nitric acid medium, the matrix matching standard curve method is used to determine the contents of calcium, magnesium, copper, lead, zinc, nickel, manganese, cadmium, aluminum,

5 Reagents or materials

Unless otherwise stated, only reagents confirmed to be of guaranteed reagents are used in the analysis.

5.1 Water, GB/T 6682, grade 2.

5.2 High purity lithium carbonate (mass fraction is greater than 99.99%, Fe, Cu, Pb, Zn, Ni, Ca, Mg, Mn, Cd, Al, are all less than 0.0001%).

5.3 Nitric acid (1+1).

5.4 Calcium standard storage solution. Weigh 0.2497 g of spectrally pure calcium carbonate into a 200 mL beaker. Then add

20.00 mL of nitric acid (5.3) and dissolve at low temperature until clear. Cool down. Transfer to a 100 mL volumetric flask. Use water to set the volume constant. Shake well. 1 mL of this solution contains

1.0 mg of calcium.

5.7 Lead standard storage solution. Weigh 0.1077 g of spectrally pure lead dioxide into a 200 mL beaker. Add

20.00 mL of nitric acid (5.3). Dissolve at low temperature until clear. Cool down. Transfer to a 100 mL volumetric flask. Use water to set the volume constant. Shake well. 1 mL of this

solution contains

5.8 Zinc standard storage solution. Weigh 0.1000 g of pure metallic zinc (spectrally pure, clean surface oxide before use) into a 200 mL beaker. Add

20.00 mL of nitric acid (5.3). Dissolve at low temperature until clear.

5.9 Nickel standard storage solution. Weigh

0.100 g of pure metallic nickel (spectrally pure, clean surface oxide before use) into a 200 mL beaker. Add another

20.00 mL of nitric acid (5.3). Dissolve at low temperature until clear. Cool down. Transfer to a 100 mL volumetric flask. Use water to set the volume constant. Shake well. 1 mL of this solution contains

1.0 mg of nickel.

5.10 Manganese standard storage solution. Weigh

0.100 g of pure metallic manganese (spectrally pure, clean surface oxide before use) into a 200 mL beaker. Add

20.00 mL of nitric acid (5.3). Dissolve at low temperature until clear. Cool down. Transfer to a 100 mL volumetric flask. Use water to set the volume constant. Shake well. 1 mL of this solution contains

1.0 mg of manganese.

5.11 Cadmium standard storage solution. Weigh

0.100 g of pure metal cadmium (spectrally pure, clean surface oxide before use) into a 200 mL beaker. Add

20.00 mL of nitric acid (5.3). Dissolve at low temperature until clear. Cool down. Transfer to a 100 mL volumetric flask. Use water to set the volume constant. Shake well. 1 mL of this solution contains

1.0 mg of cadmium.

5.12 Aluminum standard storage solution. Weigh

0.100 g of pure metallic aluminum (spectrally pure, clean surface oxide before use) into a 200 mL beaker. Add

20.00 mL of nitric acid (5.3). Dissolve at low temperature until clear. Cool down. Transfer to a 100 mL volumetric flask. Use water to set the volume constant. Shake well. 1 mL of this solution contains