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

YS/T 1028.5-2015

Methods for chemical analysis of lithium iron phosphate. Part 5: Determination of calcium, magnesium, zinc, copper, lead, chromium, sodium, aluminium, nickel, cobalt, manganese content. Inductively coupled plasma atomic emission spectrometry

磷酸铁锂化学分析方法 第5部分：钙、镁、锌、铜、铅、铬、钠、铝、镍、钴、锰量的测定 电感耦合等离子体原子发射光谱法

(English Translation)

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Foreword

YS/T 1028 Methods for chemical analysis of lithium iron phosphate consists of 5 parts.

-- Part 1.Determination of total iron content - Titanium trichloride reduction

potassium dichromate titration methods;

-- Part 2.Determination of lithium content - Flame photometry;

-- Part 3.Determination of phosphor content - Quinoline phosphomolybdate

gravimetry;

-- Part 4.Determination of carbon content - High frequency combustion with

infrared absorption method;

-- Part 5.Determination of calcium, magnesium, zinc, copper, lead, chromium,
sodium, aluminium, nickel, cobalt and manganese content - Inductively coupled
plasma atomic emission spectrometry

This part is Part 5 of YS/T 1028.

This part was drafted in accordance with the rules given in GB/T 1.1-2009.

This part was proposed and shall be under the jurisdiction of the National Technical
Committee on Nonferrous Metals of Standardization Administration of China
(SAC/TC243).

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Methods for chemical analysis of lithium iron phosphate -

Part 5. Determination of calcium, magnesium, zinc, copper, lead, chromium, sodium, aluminium, nickel, cobalt, manganese content - Inductively coupled plasma atomic emission spectrometry

1 Scope

This part of YS/T 1028 specifies the determination method of the content of calcium, magnesium, zinc, copper, lead, chromium, sodium, aluminium, nickel, cobalt and manganese in lithium iron phosphate.

This part applies to the determination of the content of calcium, magnesium, zinc, copper, lead, chromium, sodium, aluminium, nickel, cobalt and manganese in lithium iron phosphate. The measurement range is shown in Table 1.

Table 1 -- Measuring range of each element

2 Method summary

The sample is dissolved with hydrochloric acid, the carbon in it is filtered out, and the element to be measured is measured by using an inductively coupled plasma atomic emission spectrometer.

3.1 Hydrochloric acid (guaranteed reagent, $\rho \sim 1.19 \text{ g/mL}$).

Element Element Measuring range w / % Measuring range w / %

4 Instruments

Inductively coupled plasma atomic emission spectrometer.

Under the best working conditions of the instrument, any instrument that can achieve

the following indexes can be used.

5 Samples

The particle size of the sample shall not be larger than 0.10 mm.

6.1 Specimen

Weigh the sample (Chapter 5) according to Table 3, accurate to 0.0001 g.

6.2 Number of measurements

Weigh 2 specimens, conduct parallel measurements, and take the average value.

6.3 Blank test

Do a blank test along with the specimen.

6.5 Drawing of working curve

Accurately pipette 0 mL, 0.40 mL, 1.00 mL, 2.00 mL, 5.00 mL, 10.00 mL, and 20.00 mL of mixed standard solution (3.5) into 100 mL volumetric flasks, dilute to the mark with hydrochloric acid (3.3), and mix well. On the ICP spectrometer with optimized parameters, measure the spectral intensity of each element such as calcium, magnesium, zinc, copper, lead, chromium, sodium, aluminium, nickel, cobalt, and manganese, and draw a working curve.

6.6 Determination

Mass fraction / % Specimen / g Test solution volume / mL

On the ICP spectrometer with optimized parameters, measure the spectral intensity of calcium, magnesium, zinc, copper, lead, chromium, sodium, aluminium, nickel, cobalt,

7 Calculation

The content of the element to be measured is calculated based on the mass fraction w_x of the element to be measured, and the value is expressed in % and calculated according to formula (1).

8.1 Repeatability

The measured values of two independent test results obtained under repeatability conditions are within the average value range given below; the absolute difference between the two test results does not exceed the repeatability limit (r), the probability of exceeding the repeatability limit (r) does not exceed 5%, and the repeatability limit (r) is obtained by linear interpolation according to the data in Table 4.

9 Test report

The test report shall include the following content.

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