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

XB/T 601.1-2008

Replacing XB/T 601.1-1993

**Chemical analysis methods of lanthanum boride -
Determination of boron content - Acid alkali titration method
(English Translation)**

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Foreword

This standard is divided into the following 5 parts.

XB/T 601.1-2008 Methods for chemical analysis of lanthanum hexaboride. Determination of boron content. Acid-base titration XB/T 601.2-2008 Methods for chemical analysis of lanthanum hexaboride Determination of iron, calcium, magnesium, chromium, manganese, and copper content inductively coupled plasma Emission spectroscopy XB/T 601.3-2008 Methods for chemical analysis of lanthanum hexaboride-Determination of tungsten content-Inductively coupled plasma emission spectrometry XB/T 601.4-2008 Methods for chemical analysis of lanthanum hexaboride. Determination of carbon content. High frequency induction combustion infrared absorption method XB/T 601.5-2008 Methods for chemical analysis of lanthanum hexaboride-Determination of acid-soluble silicon content-Silicon molybdenum blue spectrophotometric method this part is Part 1: This part is based on XB/T 601.1-1993 "Methods for chemical analysis of lanthanum hexaboride by acid-base titration" Revision of "Determining Boron Amount". Compared with XB/T 601.1-1993, the main changes are as follows.

---Edited the standard text;

--- Added precision (repeatability) clause.

This part was proposed and managed by the National Rare Earth Standardization Technical Committee.

1 Scope

This section specifies the determination method of boron content in lanthanum hexaboride.

This part is applicable to the determination of boron content in lanthanum hexaboride, with the determination range. 20.00% to 40.00%.

2 Principles of the method

The sample is dissolved in dilute nitric acid, lanthanum is complexed with ethylenediaminetetraacetic acid disodium salt, and the solution is adjusted to neutral with sodium hydroxide, and mannitol is added to make it Complex with boric acid. Quantitatively release hydrogen ions, add excess sodium hydroxide standard solution, back titrate with hydrochloric acid, according to hydrochloric acid and sodium hydroxide standard Calculate the mass fraction of boron based on the consumption of quasi-solution.

3 Reagents

3.1

Mannitol.

3.2

Nitric acid (1+3).

3.3

Hydrochloric acid (1+3).

3.4

Sodium hydroxide solution (200g/L).

3.5

hexamethylenetetramine (400g/L).

3.6

Disodium ethylenediaminetetraacetic acid solution [$(\text{C}_{10}\text{H}_{14}\text{N}_2\text{Na}_2\text{O}_8) \sim 0.015\text{mol/L}$].

Weigh 9.3g disodium ethylenediaminetetraacetic acid reagent ($\text{C}_{10}\text{H}_{14}\text{N}_2\text{Na}_2\text{O}_8 \cdot 2\text{H}_2\text{O}$) in a 400mL beaker, add 200mL water, a few drops of sodium hydroxide solution (3.4), heat to dissolve, cool, Transfer to a 1000mL volumetric flask, dilute to the mark with water, and mix well.

3.7

Barium chloride (100g/L).

3.8

Standard solution of sodium hydroxide [$(\text{NaOH}) \sim 0.15\text{mol/L}$].

3.8.1

Preparation. Weigh 6g of sodium hydroxide in a 1000mL beaker, add 10mL of barium chloride solution (3.7), boil for 1min~2min, Dilute with water to 1000mL, mix well, stand still, transfer the supernatant to a plastic bottle for storage.

3.8.2

Calibration. Weigh 3 parts of 0.3000g of phthalic acid that has been pre-baked at 105°C to 110°C for 1 hour and placed in a desiccator to cool to room temperature.

Potassium hydrogen standard reagents were placed in 250ml Erlenmeyer flasks, dissolved with 20ml ethanol, and 50ml water was boiled to drive off CO₂, 2 drops ~ 3 drops of titanium phenoxide indicator (3.12), titrated with sodium hydroxide standard solution (3.8) until the solution has just become a stable reddish color as the end point. 3 solutions the difference in volume of the standard sodium hydroxide solution should not exceed 0.05mL, and the average value should be used.

Calculate the actual concentration of sodium hydroxide standard solution (3.8) according to formula (1).

Where.

Q0---The actual concentration of sodium hydroxide standard solution, in moles per liter (mol/L);

V---the average volume of sodium hydroxide standard solution consumed in the titration, in milliliters (mL);

204.2---The molar mass of potassium hydrogen phthalate, in grams per mole (g/mol).

3.9

Hydrochloric acid standard solution [?(HCl)~0.1mol/L].

3.9.1

Preparation. Pipette 25mL hydrochloric acid (3.3) into a 100mL volumetric flask, dilute to the mark with water, and mix.

3.9.2

Calibration. Pipette 3 parts of 25.0mL hydrochloric acid standard solution (3.9) into 250mL Erlenmeyer flasks, add 50mL to drive by boiling XB/T 601.1-2008