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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 6609.35-2023

Chemical analysis methods and determination of physical performance of alumina - Part 35: Determination of specific surface area - Nitrogen adsorption method

氧化铝化学分析方法和物理性能测定方法 第35部分：比表面积的测定 氮吸附法

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Standardization Administration of the PRC

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents" Drafting. This document is Part 35 of GB/T 6609 "Chemical Analysis Methods and Physical Properties Determination Methods of Alumina". GB/T 6609 has been The following sections were published.

1.Determination of trace element content by inductively coupled plasma atomic emission spectrometry;

2.Determination of mass loss at 300°C and 1000°C;

3.Determination of silica content by molybdenum blue photometry;

4.Determination of ferric oxide content by photometric method of o-phenanthroline;

5.Determination of sodium oxide content;

6.Determination of potassium oxide content;

7.Determination of titanium dioxide content by photometric method using diantipyrinomethane;

8.Determination of chromium trioxide content by diphenylcarbazide photometric method;

9.Determination of copper oxide content by new cuprophotometric method;

10.Determination of vanadium pentoxide content by benzoyl phenyl hydroxylamine extraction photometry;

11.Determination of manganese monoxide content by flame atomic absorption spectrometry;

12.Determination of zinc oxide content by flame atomic absorption spectrometry;

1 Scope

GB/T 6609.35-2023 is Part 35 of the Chinese series on the analysis of alumina, and determines the specific surface area by nitrogen adsorption. For smelter grade alumina the surface area is not a curiosity but a process parameter: it governs how fast the alumina dissolves in the cryolite bath and how much hydrogen fluoride the material can adsorb in the dry scrubber that cleans the potline gas, so a low surface area alumina both dissolves poorly and cleans the gas poorly. The BET method measures it by adsorbing nitrogen at liquid nitrogen temperature and computing the monolayer capacity. The standard sets the principle, the reagents and materials, the instruments and equipment, the sample preparation and degassing, the measurement procedure, the calculation of the result and the test report. It took effect on 1 March 2024.

This document describes a method for the determination of the specific surface area (SSA) of alumina using the nitrogen adsorption method. This document is applicable to the determination of the specific surface area of alumina. The measurement range is. 50.0m2/g~150.0m2/g.

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, the dated quotations For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document.

GB/T 6609.22 Sampling methods for chemical analysis and physical property determination of alumina (GB/T 6609.22-2004, ISO 2927.1973,MOD)

GB/T 6609.23 Preparation and storage of samples for chemical analysis and physical property determination of alumina (GB/T 6609.23- 2004, ISO 802.1976, MOD)

GB/T 8170 Numerical rounding rules and expression and determination of limit values

3 Terms and definitions

There are no terms or definitions to be defined in this document.

4 Method Principle

Degas the sample at 300°C for 2 hours under vacuum or flowing nitrogen, weigh the sample, and determine the nitrogen adsorbed on the surface of the sample based on the boiling point of liquid nitrogen. Ability, use an instrument to measure the adsorption capacity of the sample, and calculate the ratio table of the sample according to the adsorption theory

proposed by "Bronauer-Emmett-Teller" area.

5 Reagents or materials

Warning. Use extreme caution when handling cryogenic liquids to prevent frostbite.

5.1 Liquid nitrogen. Boiling point at 101.3kPa is -196°C.

5.2 Nitrogen. the volume fraction is greater than 99.99%.

5.3 Other gases. Determine according to the instrument instructions.

5.4 Alumina standard sample. If the SSA value is in the range of 50m2/g~150m2/g, GB W13911 should be used.

6 Instruments and Equipment

6.1 Specific surface area analyzer. It can adsorb nitrogen at -196°C and can perform single-point or multi-point analysis. Single point method and multi-point method