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

GB/T 16555.1-1996

Replacing GB/T 16555-2017

**Chemical analysis of refractories containing carbon, silicon
carbide or nitride
(English Translation)**

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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 replaces GB/T 16555-2017 "Chemical Analysis Methods for Carbon-Containing, Silicon Carbide, and Nitride Refractory Materials", and is consistent

with GB/T 16555-Compared to 2017, aside from structural adjustments and editorial changes, the main technical changes are as follows.

- a) An electric furnace and a pH meter were added (see 4.5, 4.12);
- b) The regulations for pure water have been changed (see 6.1.1, see 6.1.1 in the 2017 version);
- c) The holding time for determining the loss on ignition at 850°C using the box furnace oxidation method was modified, and the determination of loss on ignition at 1050°C was added.

Method (see 8.2);

- d) The reaction equation was modified (see 14.1.1, 15.1.1 in the 2017 version);
- e) Added specifications for the volume of gas measuring tubes and reference tubes (see 14.1.2.10);
- f) The determination of hafnium oxide and yttrium oxide has been added (see Chapter 17);
- g) The analysis items and test personnel in the test report have been added (see Chapter 18).

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed and is under the jurisdiction of the National Technical Committee on Standardization of Refractory Materials (SAC/TC193).

1 Scope

This document describes the heat treatment loss on ignition, volatile matter, total carbon content, free carbon content, and carbon content of carbon-containing, silicon carbide, and nitride refractories.

Chemical content of silicon nitride, total nitrogen, total oxygen, silicon nitride, free silicon, free aluminum, iron oxide, aluminum oxide, and other oxides Analytical methods.

This document applies to carbon-, silicon carbide-, and silicon nitride-containing refractory materials, such as magnesia-carbon bricks, semi-graphite carbon bricks, alumina-zirconium-carbon bricks, and silicon carbide-containing castables.

Chemical analysis of silicon nitride-bonded silicon carbide bricks, etc.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

GB/T 223.69-2008 Determination of Carbon Content in Iron and Steel and Alloys - Volumetric Method of Gas After Combustion in Tubular Furnace GB/T 4513.2 Unshaped refractories - Part 2: Sampling GB/T 4984 Chemical Analysis Methods for Zirconium-Containing Refractory Materials GB/T 5069 Chemical Analysis Methods for Magnesium-Aluminum Refractories GB/T 5070 Chemical Analysis Methods for Chromium-Containing Refractory Materials GB/T 6682 Specifications and test methods for water used in analytical laboratories GB/T 6900-2025 Chemical Analysis Methods for Aluminosilicate Refractory Materials GB/T 6901 Chemical Analysis Methods for Siliceous Refractory Materials GB/T 7728 General Rules for Chemical Analysis of Metallurgical Products by Flame Atomic Absorption Spectrometry GB/T 8170 Rules for rounding off numerical values and the representation and determination of limiting values GB/T 10325 Sampling Inspection Rules for Acceptance of Shaped Refractory Products GB/T 12805 Burettes for Laboratory Glassware GB/T 12806 Laboratory Glassware - Single-mark volumetric flasks GB/T 12808 Laboratory Glassware - Single-mark Pipettes GB/T 17617 Sampling Inspection Rules for Refractory Raw Materials GB/T 17732 Test methods for dense, shaped carbon-containing refractories GB/T 18930 Terminology for Refractory Materials

3 Terms and Definitions

The terms and definitions defined in GB/T 18930 apply to this document.

4 Instruments and Equipment

4.1

Balance. graduation value 0.1 mg and graduation value 0.5 g.

4.2

Double-lid porcelain crucible.

4.3

Platinum or porcelain dishes. 75 mL or more.

4.4

Platinum or porcelain crucible. 30 mL or more.

4.5

Electric furnace. 3000W power, with automatic temperature control.

4.6

Forced-air drying oven. A drying oven with a maximum operating temperature of $\geq 300^{\circ}\text{C}$ and automatic temperature control.

4.7

Tubular high-temperature furnace. A tubular electric furnace with a maximum operating temperature of $\geq 1300^{\circ}\text{C}$ and automatic temperature control.

4.8

Box-type high-temperature furnace. A box-type electric furnace with a maximum operating temperature of $\geq 1100^{\circ}\text{C}$ and automatic temperature control.

4.9

Pipettes. Grade A in GB/T 12808.

4.10

Burette. Grade A in GB/T 12805.

4.11

Volumetric flasks. Grade A in GB/T 12806.

4.12

pH meter. accuracy grade 0.1.

4.13

Spectrophotometer. Wavelength range 380nm~700nm.

4.14

The flame photometer, under optimal conditions, should meet the following specifications.

---Stability. When the same test solution is continuously injected within 15 seconds, the instrument reading drift is no greater than 2.

---Reproducibility. When the same test solution was measured repeatedly 7 times, the relative deviation of the measured values was less than 1.5%.

4.15

Nitrogen and oxygen analyzer. capable of automatic analysis and calibration using standard samples with known nitrogen and oxygen content.

4.16

High-frequency infrared absorption carbon (sulfur) analyzer. It can automatically complete the analysis operation and can be calibrated using a standard sample with known carbon content.