

ICS 81.080

CCS Q 40



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

GB/T 5069.1-2001

**Chemical analysis of magnesia-alumina refractories
(English Translation)**

Issued on: August 23, 2024

Implemented on: August 23, 2024

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

Preface	
Introduction	
1 Scope	
2 Normative references	
3 Terms and Definitions	
4 Instruments and equipment	
5 Sample preparation	
6 General Provisions	
7 Determination of loss on ignition	
8 Determination of silicon dioxide	
9 Determination of Alumina	
10 Determination of Iron Oxide	
11 Determination of Titanium Dioxide	
12 Determination of calcium oxide	
13 Determination of magnesium oxide	
14 Determination of potassium oxide and sodium oxide	
15 Determination of manganese oxide [w (MnO) ≤ 0.5%]	
16 Determination of phosphorus pentoxide [w (P ₂ O ₅) ≤ 3%]	
17 Determination of free calcium oxide in magnesia	
18 Determination of zirconium oxide (hafnium) by EDTA volumetric method	
19 Determination of Chromium Trioxide by Ammonium Ferrous Sulfate Volumetric Method	
20 Silicon dioxide, aluminum oxide, iron oxide, titanium oxide, calcium oxide, potassium oxide, sodium oxide, manganese oxide, phosphorus pentoxide, zirconium oxide, trioxide	
Determination of dichromium (Inductively coupled plasma optical emission spectrometry)	
21 Test Report	
Appendix A (Normative) Analytical Value Acceptance Procedure	
Appendix B (Informative) Standard Curve of Inductively Coupled Plasma Optical Emission Spectrometer	

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting is required.

This document replaces GB/T 5069-2015 "Chemical analysis methods for magnesium-aluminum refractory materials".

In addition to structural adjustments and editorial changes, the main technical changes are as follows.

a) The provisions of the element "scope" for the measurement range of content have been changed, and "Table 1 Measurement Range" has been deleted (see Chapter 1, 2015 Edition).

Chapter 1);

b) Added a chapter on "Terms and Definitions" (see Chapter 3);

c) Added the normative reference document "GB/T 4513.2" (see 5.1);

d) The content range of titanium dioxide determined by dianthipyryl methane spectrophotometry has been changed (see 11.1, 11.1 of the 2015 edition);

e) The calculation method for determining magnesium oxide content by the "subtraction method" has been changed (see 13.3, 13.3 of the 2015 edition);

f) Deleted the "high-precision measurement method" in the analysis results of the element "flame atomic absorption spectrometry" (see 14.1.6.2 of the 2015 edition);

g) Deleted the "high-precision measurement method" in the analysis result of the element "Determination of manganese oxide" (see 15.6.2 of the 2015 edition);

h) The determination range in the element "Determination of phosphorus pentoxide" was changed (see Chapter 16, Chapter 16 of the 2015 edition);

i) The elements "silicon dioxide, aluminum oxide, iron oxide, titanium oxide, calcium oxide, potassium oxide, sodium oxide, manganese oxide, Determination of phosphorus, zirconium oxide and chromium trioxide (inductively coupled plasma emission spectrometry)", the provisions on the determination content range are deleted.

Except "w(MXOY)≤15%" (see Chapter 20, Chapter 20 of the 2015 edition);

j) The provisions for taking the median of the analysis results in the "Appendix A" analysis value acceptance procedure have been changed (see Appendix A, Appendix.2015 Edition).

Record A).

Introduction

With the development of magnesium-aluminum refractory materials, the original chemical analysis method standards can no longer meet the application requirements.

ICP-AES is the first choice for chemical analysis of magnesium-aluminum refractory materials, but ICP-AES equipment is expensive, difficult to use and maintain.

Due to the high cost and late appearance of method standards, the popularity of spectrophotometer in laboratories of the refractory industry is far lower than that in other industries.

The operation procedure is simple and cost-effective. It is a commonly used analytical instrument with high penetration rate in laboratories in the refractory industry, especially for magnesium-aluminum refractory materials.

The purpose of this revision is to change the spectrophotometric method for the determination of phosphorus pentoxide.

The detection range of titanium dioxide is determined by the ICP-AES method in Chapter 20.

The standards are more scientific and rigorous, keep pace with the times, and better serve the development of the industry.

Chemical analysis method for magnesium-aluminum refractories Warning. Personnel using this document should have practical experience in regular laboratory work, be familiar with the physical and chemical properties of strong acids and bases, and sample pretreatment.

High temperatures, strong acids and alkalis in the process are all dangerous sources, and workers need to master their safe operating procedures. This document does not indicate all possible Regarding safety issues, users are responsible for taking appropriate safety and health measures and ensuring that the conditions stipulated by relevant national laws and regulations are met.

1 Scope

This document describes the chemical properties of magnesium-aluminum refractory materials such as loss on ignition (LOI), silicon dioxide (SiO_2), and alumina (Al_2O_3).

Analytical methods.

This document is applicable to magnesium-aluminum refractory materials, such as magnesium (zirconium) bricks, magnesium-aluminum (zirconium) bricks, magnesium (aluminum) spinel bricks, magnesium-silicon bricks, magnesium dolomite (zirconium) Bricks and other products and raw materials such as magnesite and spinel.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

GB/T 4513.2 Monolithic refractory materials Part 2: Sampling GB/T 4984 Chemical analysis methods for zirconium-containing refractories GB/T 5070 Chemical analysis methods for chromium-containing refractories GB/T 7728 General rules for chemical analysis of metallurgical products by flame atomic absorption spectrometry GB/T 8170 Rules for rounding off values and expression and determination of limit values GB/T 10325 Rules for acceptance sampling of shaped refractory products GB/T 12805 Laboratory glass instrument burette GB/T 12806 Laboratory glassware single-line volumetric flasks GB/T 12808 Laboratory glassware single-line pipettes GB/T 17617 Rules for sampling and inspection of refractory raw materials GB/T 18930 Terminology of Refractory Materials GB/T 32179 Chemical analysis of refractory materials by wet method, atomic absorption spectrometry (AAS) and inductively coupled plasma atomic emission General requirements for spectroscopy (ICP-AES)

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.

4.2

Platinum crucible or porcelain crucible. 30 mL.