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

GB/T 34333-2025

Replacing GB/T 34333-2017

**Refractories - Chemical analysis by inductively coupled plasma
atomic emission spectrometry (ICP-AES)**

耐火材料 电感耦合等离子体原子发射光谱 (ICP-AES) 化学分析方法

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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.

This document replaces GB/T 34333-2017 "Analysis Method of Refractory Materials by Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES)" Compared with GB/T 34333-2017, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

a) The scope of application has been changed, 16 analytical items such as Li₂O and their applicable measurement ranges have been added, and the scope of K₂O and Na₂O has been expanded.

Determination range, the method detection limit of each test item is given (see Chapter 1, Chapter 1 of the 2017 edition);

- b) Deleted the requirements for inductively coupled plasma atomic emission spectrometers (see 3.1 of the 2017 edition);
- c) Added requirements for reagents and test water (see 5.1);
- d) Added the allowable deviation requirement for analytical values when the content is less than or equal to 0.1% (see 5.5.2);
- e) Added requirements for sample preparation tools, equipment and media (see 7.2.3);
- f) Added the provisions on reagents (see Chapter 8);
- g) Deleted the provisions on optimization of instrument working conditions (see Chapter 9 of the 2017 edition);
- h) Added the types and methods of preparing standard solutions (see Chapter 9);
- i) Added the types and methods of preparing matrix solutions (see Chapter 10).

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

This document is proposed and coordinated by the National Technical Committee for Standardization of Refractory Materials (SAC/TC193).

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This document was first published in 2017 and this is the first revision.

Inductively Coupled Plasma Atomic Emission Scanning of Refractory Materials Spectroscopic (ICP-AES) chemical analysis method Warning. Personnel using this document should have practical experience in regular laboratory work and be familiar with the physical and chemical properties of strong acids and bases. Sample Pretreatment High temperatures, strong acids and strong alkalis in the process are all dangerous sources, and workers must master their safe operating procedures. This document does not indicate all possible safety hazards.

For 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 determination of silicon oxide, aluminum oxide, and Analysis methods for chemical components such as calcium and magnesium oxide.

This document is applicable to refractory raw materials and their preparation methods such as silicon-alumina refractory materials, zirconium-containing refractory materials, magnesia-containing refractory materials, carbon-containing refractory materials, etc.

The detection limit and determination range of the method are shown in Table 1.

Table 1 Detection limit and measurement range of the method Analysis Project Method
 detection limit (mass fraction) content (mass fraction) Analysis Project Method detection
 limit (mass fraction) content (mass fraction) Al₂O₃ 0.001 ≤10 P₂O₅ 0.002 ≤10 SiO₂
 0.002 ≤10 V 0.001 ≤5 Fe₂O₃ 0.0005 ≤10 Co 0.001 ≤5 CaO 0.001 ≤10 Nb 0.002 ≤5
 MgO 0.002 ≤10 Ni 0.0005 ≤5 TiO₂ 0.001 ≤10 Mo 0.002 ≤5 K₂O 0.001 ≤10 Cu 0.002
 ≤5 Na₂O 0.001 ≤10 Cd 0.0005 ≤5 Cr₂O₃ 0.001 ≤15 Zn 0.001 ≤5 ZrO₂ 0.001 ≤10
 Sn 0.001 ≤5 HfO₂ 0.001 ≤10 As 0.002 ≤5 Y₂O₃ 0.001 ≤15 Ba 0.0005 ≤5 MnO 0
 0.0005 ≤10 Sr 0.002 ≤5 Li₂O 0.002 ≤10 Pb 0.002 ≤5 B₂O₃ 0.002 ≤15 W 0.001 ≤5
 Note. Metal oxides not listed above or metal oxides whose content exceeds the specified
 value shall be determined after verification of precision and accuracy.