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Fine ceramics (advanced ceramics, advanced technical ceramics) — Methods for chemical analysis of impurities in yttrium oxide powders using inductively coupled plasma-optical emission spectrometry

Céramiques techniques (céramiques avancées, céramiques techniques avancées) — Méthodes d'analyse chimique des impuretés contenues dans les poudres d'oxyde d'yttrium à l'aide de la spectrométrie d'émission optique par plasma à couplage inductif

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Foreword

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This document was prepared by Technical Committee ISO/TC 206, *fine ceramics*.

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Fine ceramics (advanced ceramics, advanced technical ceramics) — Methods for chemical analysis of impurities in yttrium oxide powders using inductively coupled plasma-optical emission spectrometry

WARNING — Suitable health and safety procedures should be followed. Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to determine applicability of any national regulatory conditions.

1 Scope

This document specifies methods for chemical analysis of impurities in refined high-purity yttrium oxide (Y_2O_3) powders used as a raw material for fine ceramics.

This document is applicable for determination of aluminium (Al), calcium (Ca), cobalt (Co), iron (Fe) and silicon (Si) in yttrium oxide powders. Yttrium oxide powders are decomposed by microwave decomposition method. The aluminium (Al), calcium (Ca), cobalt (Co), iron (Fe) and silicon (Si) contents are determined by using inductively coupled plasma-optical emission spectrometry (ICP-OES).

This document does not apply to coarse unrefined powders from mineral extraction and processing operations, which are covered by ISO 24181-1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 8656-1, *Refractory products — Sampling of raw materials and unshaped products — Part 1: Sampling scheme*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Principle

The samples are digested by hydrochloric acid (1+1) or nitric acid (1+1) in closed vessels using a microwave digestion system, and the test solution is diluted with water. In order to determine the contents of impurities in yttrium oxide with an ICP-OES, the effect of the main component, i.e. yttrium, is corrected with a blank standard solution and mixed standard solutions at the optimum wavelength of each element. Create a

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