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

GB/T 28634-2025

Replacing GB/T 28634-2012

**Microbeam analysis - Electron probe microanalysis -
Quantitative point analysis for bulk specimens using
wavelength dispersive X-ray spectroscopy**

微束分析 电子探针显微分析 块状试样波谱法定量点分析

(English Translation)

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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 is required.

This document replaces GB/T 28634-2012 "Microbeam analysis electron probe microanalysis of bulk samples spectroscopy quantitative point analysis" Compared with GB/T 28634-2012, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

- a) Added the abbreviations for scanning electron microscope and energy dispersive spectrometer (see Chapter 3);
- b) The requirement for the analysis volume has been changed from "the analysis volume should be larger than the X-ray excitation volume" to "the analysis volume should be uniform and Larger than the X-ray excitation volume" (see 4.4.1, 4.4.1 of the 2012 edition);
- c) Changed the requirements for the selection of analytical crystals. "Analytical crystals should be selected based on the crystal materials of the instrument.

The following sentence is changed to "The analysis crystal should be measured by the instrument" (Information provided by the manufacturer or selection of information obtained from reference books) (see 4.4.8, 4.4.8 of the 2012 edition);

- d) The nature of Appendix C is changed from normative to informative.

This document is equivalent to ISO 22489:2016 "Microbeam analysis - Electron probe microanalysis of bulk samples - Quantitative point analysis by spectroscopy".

Introduction

Electron probe microanalysis has been widely used in the quantitative analysis of material composition elements.

The ease of use of sub-probe microanalyzers has been greatly improved. To obtain accurate quantitative results with this powerful tool, to obtain reliable data, the instrument must be used correctly. Optimal operating procedures are also required, such as sample preparation, characteristic X-ray intensity measurement, this document gives the standard operating procedures for the measurement of mass and calculation of mass fraction from X-ray intensity.

Microbeam analysis Electron probe microscopy Quantitative point analysis of bulk samples by spectroscopy

1 Scope

This document specifies the use of electron probe microanalyzers or wavelength spectrometers (WDS) mounted on scanning electron microscopes (SEMs) to analyze the requirement for quantitative analysis of elements within the micrometer-scale volume of the sample by X-rays generated by interaction with the sample.

This document also includes the following.

- Principles of quantitative analysis;
- General range of elements, mass fractions and reference materials involved in this method;
- General requirements for instruments;
- Basic processes such as sample preparation, experimental condition selection, analysis, measurement and reporting.

This document is applicable to the quantitative analysis of block samples with smooth and uniform surface when the electron beam is incident vertically.

There are no special requirements. Users should obtain information such as instrument installation conditions, detailed operating procedures and instrument specifications from the instrument manufacturer.

2 Normative references

The contents of the following documents constitute 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 27025-2019 General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2017, IDT) Note. There is no technical difference between the referenced content of GB/T 27025-2019 and the referenced content of ISO/IEC 17025:2005.

ISO 14594 Microbeam analysis - Electron probe microanalysis spectroscopy - Guidelines for the determination of experimental parameters Note. GB/T 30705-2014 Microbeam analysis - Electron probe microanalysis - Guidelines for the determination of experimental parameters (ISO 14594:2009, MOD) ISO 14595 Microbeam analysis Electron probe microanalysis standard sample technical conditions guide Note. GB/T 4930-2021 Microbeam analysis - Guidelines for the technical conditions of standard samples for electron probe microanalysis (ISO 14595:2014, IDT)