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

GB/T 20725-2025

Replacing GB/T 20725-2006

**Microbeam analysis - Electron probe microanalysis - Guidelines
for qualitative point analysis by wavelength dispersive X-ray
spectrometry**

微束分析 电子探针显微分析 波谱法定性点分析导则
(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 20725-2006 "Guidelines for Electron Probe Microanalysis of Polarization Points by Spectroscopy" and is compatible with GB/T 20725-Compared with 2006, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

- a) Changed the term "high-order diffraction" to "higher-order diffraction" and corrected the definition (see 3.1, 3.1 of the 2006 Edition);
- b) Change the content in the note "When the intensity of the identified spectral peak is close to the background intensity, it means that the suspicious peak is not the background." to the main text (see 6.3.1, Note to 6.3.1 of the 2006 edition);
- c) The values of confidence level and probability of peak existence have been modified (see 6.3.1, 6.3.1 of the 2006 edition).

This document is equivalent to ISO 17470:2014 "Guidelines for qualitative point analysis by electron probe microanalysis spectroscopy in microbeam analysis".

Introduction

Electron probe microanalysis is often used to qualitatively identify the elements present in a micro-region of a sample. In order to avoid erroneous analysis results, it is necessary to standardize the measurement conditions and element identification methods.

Microbeam analysis Electron probe microscopy Guidelines for the analysis of neutral points by spectroscopy

1 Scope

This document gives the results of using an electron probe microanalyzer or a spectrometer accessory to a scanning electron microscope to obtain the A method of using X-ray spectra to identify elements and confirm the presence of specific elements.

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 30705-2014 Microbeam analysis electron probe microanalysis spectroscopy experimental parameters determination guide (ISO 14594.

2009, MOD)

Note: There is no technical difference between the contents cited in GB/T 30705-2014 and those cited in ISO 14594:2003.

3 Terms and definitions

The following terms and definitions apply to this document.

Higher order reflections Spectral peaks appear corresponding to diffraction angles of $n = 2, 3$, and 4.

Note: In a wave spectrometer (WDS), X-rays are diffracted according to Bragg's law $n\lambda = 2d\sin\theta$, where λ is the wavelength of the X-rays, d is the interplanar spacing of the crystal, and θ is the diffraction distance.

The diffraction angle is $n = 2, 3, 4$, and n is an integer.

point analysis

The incident electron beam is fixed to illuminate the selected area of the sample surface for

analysis.

NOTE: This method also includes the analysis of a very small area of the sample surface where the incident electron beam is scanned rapidly. The maximum electron beam size or the electron beam scanning range is determined by the fact that the relative intensity of X-rays does not change when the analysis area is expanded.

Rowland circle

The focusing circle of the X-ray source, diffraction crystal and detector satisfies the Bragg diffraction conditions.

X-ray line table

X-ray data sheet for EPMA qualitative analysis.

Note: The X-ray table for EPMA qualitative analysis lists the wavelength values of the K, L, and M lines of the element observed on each diffraction crystal.

The relative intensity, half-height width, interplanar spacing of the diffraction crystal and the wavelength of the satellite peak of each peak are given.

4 Abbreviations

EPMA. Electron probe microanalysis