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

*Analyse par microfaisceaux — Analyse par microsonde électronique
(Microsonde de Castaing) — Lignes directrices pour l'analyse
qualitative ponctuelle par spectroscopie de rayons X à dispersion de
longueur d'onde*



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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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ISO 17470 was prepared by Technical Committee ISO/TC 202, *Microbeam analysis*, Subcommittee SC 2, *Electron probe microanalysis*.

Introduction

Electron probe microanalysis is used to qualitatively identify the elements present in a specimen on a micrometric scale. It is necessary to specify the measurement conditions and identification method in order to avoid reporting erroneous or inconsistent results.

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

1 Scope

This International Standard gives guidance for the identification of elements and the investigation of the presence of specific elements within a specific volume (on a μm^3 scale) contained in a specimen, by analysing X-ray spectra obtained using wavelength dispersive X-ray spectrometers on an electron probe microanalyser or on a scanning electron microscope.

2 Normative references

The following referenced documents are indispensable for the application 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 14594:2003, *Microbeam analysis — Electron probe microanalysis — Guidelines for the determination of experimental parameters for wavelength dispersive spectroscopy*

3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

3.1

higher order reflections

peaks appearing at the diffracted angles corresponding to $n = 2, 3, 4, \dots$

NOTE In WDS, X-rays are dispersed according to Bragg's law, $n\lambda = 2d \sin \theta$, where λ is the X-ray wavelength, d is the interplanar spacing of the diffraction crystal, θ is the diffraction angle, and n is an integer. The higher order reflections are the peaks appearing at the diffracted angles corresponding to $n = 2, 3, 4, \dots$

3.2

point analysis

analysis in which the primary beam is fixed, thus irradiating a selected region of a sample surface

NOTE The method where the primary beam rapidly scans over a very small region on the sample surface is also included. The maximum size of a static beam or a raster area should be chosen such that relative X-ray intensities do not change when enlarging the analysis area.

3.3

Rowland circle

⟨in a wavelength dispersive X-ray spectrometer⟩ the circle of focus along which the X-ray source, diffractor and detector must all lie in order to satisfy the Bragg condition and obtain constructive interference