International Standard

ISO 14594

Microbeam analysis — Electron probe microanalysis — Guidelines for the determination of experimental parameters for wavelength dispersive spectroscopy

Analyse par microfaisceaux — Analyse par microsonde électronique (Microsonde de Castaing) — Lignes directrices pour la détermination des paramètres expérimentaux pour la spectrométrie à dispersion de longueur d'onde

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Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Abbreviated terms ... **3**
5 Experimental parameters ... **3**
5.1 General ... 3
5.2 Parameters related to the electron probe ... 3
5.2.1 Accelerating voltage ... 3
5.2.2 Probe current ... 3
5.2.3 Magnification and field of view ... 3
5.3 Parameters related to wavelength dispersive X-ray spectrometers ... 3
5.3.1 General ... 3
5.3.2 Take-off angle ... 4
5.3.3 Wavelength resolution ... 4
5.3.4 X-ray detector and Pulse height analyser ... 4
5.3.5 Peak location (wavelength) ... 4
5.3.6 Background ... 5
5.4 Parameters related to the specimen ... 5
5.4.1 Specimen stage ... 5
5.4.2 Surface roughness ... 5
5.4.3 X-ray line ... 5
5.4.4 Analysis volume ... 5
6 Procedures and measurements ... **6**
6.1 General ... 6
6.2 Electron probe ... 6
6.2.1 Probe current ... 6
6.2.2 Probe diameter ... 6
6.3 Parameters related to measured peaks ... 7
6.3.1 Dead time correction ... 7
6.3.2 Wavelength resolution of detected characteristic X-ray peaks ... 7
6.3.3 Background subtraction ... 8
6.4 Parameters related to the specimen ... 9
6.4.1 General ... 9
6.4.2 Analysis area ... 9
6.4.3 Analysis depth ... 9
6.4.4 Analysis volume ... 9
7 Test report ... **9**
Annex A (informative) **Methods of estimating analysis area** ... **11**
Annex B (informative) **Methods of estimating analysis depth** ... **13**
Annex C (informative) **Method of estimating X-ray analysis volume by applying the Monte Carlo (MC) simulation** ... **14**
Bibliography ... **18**

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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

This third edition cancels and replaces the second edition (ISO 14594:2014), which has been technically revised.

The main changes are as follows:

— Introduction has been added;

— Terms in Clause 3 have been updated;

— Technical terms in Clause 5 have been updated and the clause has been restructured;

— Content of the Test report in Clause 7 has been revised.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

To ensure reliability and reproducibility during electron probe microanalysis (EPMA), the experimental parameters that include beam current, current density, dead time, wavelength resolution, background, analysis area, analysis depth, and analysis volume should be carefully considered. To reliably consider EPMA results, guidelines standardizing the decision procedure of an experimental parameter are important.

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Microbeam analysis — Electron probe microanalysis — Guidelines for the determination of experimental parameters for wavelength dispersive spectroscopy

1 Scope

This document gives general guidelines for the determination of experimental parameters relating to the electron probe, the wavelength spectrometer, and the specimen that need to be taken into account when carrying out electron probe microanalysis. It also defines procedures for the determination of probe current, probe diameter, dead time, wavelength resolution, background, analysis area, analysis depth, and analysis volume.

This document is applicable for the analysis of a well-polished specimen using normal beam incidence.

This document does not apply to energy dispersive X-ray spectroscopy.

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/IEC 17025:2017, *General requirements for the competence of testing and testing laboratories*

3 Terms and definitions

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

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/

3.1
analysis area
area, projected by the interaction volume on the beam entrance surface, from which X-rays are emitted (at a defined fraction, e.g. 95 % of the total) and collected by the spectrometer

[SOURCE: ISO 23833:2013, 5.7.1.1]

3.2
analysis depth
maximum depth from which a defined fraction (e.g. 95 % of the total) of the X-rays are emitted from the interaction volume after absorption

[SOURCE: ISO 23833:2013, 5.7.1.2]

3.3
analysis volume
volume from which a defined fraction (e.g. 95 % of the total) of the X-rays are emitted after generation and absorption

[SOURCE: ISO 23833:2013, 5.7.1.3]

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