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Microbeam analysis — Electron probe microanalysis — Guidelines for the specification of certified reference materials (CRMs)

Analyse par microfaisceaux — Microanalyse par sonde à électrons — Lignes directrices pour les spécifications des matériaux de référence certifiés (CRM)

Reference number
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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.

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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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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 14595:2014), which has been technically revised.

The main changes are as follows:

— formulae to calculate the uncertainty of the mean mass fraction in 5.6 has been modified by adding a power of 1/2;

— the requirement of the dead time for the energy dispersive spectrometer test has been removed;

— editorial changes have been made to improve the consistency of terms and definitions used throughout the document.

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

For electron probe microanalysis (EPMA), which is a comparative quantitative analytical method used globally, certified reference materials (CRMs) play a crucial role in the analytical accuracy.

This document has been developed to facilitate international exchange and compatibility of analysis data in EPMA.

It aims to give guidance on evaluating and selecting reference materials (RMs), on evaluating the extent of heterogeneity and stability of RMs. It gives recommendations for the determination of the chemical composition of RMs for production as EPMA-certified reference materials.

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Microbeam analysis — Electron probe microanalysis — Guidelines for the specification of certified reference materials (CRMs)

1 Scope

This document specifies recommendations for single-phase certified reference materials (CRMs) used in electron probe microanalysis (EPMA). It also provides guidance on the use of CRMs for the microanalysis of flat, polished specimens. It does not cover organic or biological materials.

This document supplements ISO 17034. A producer of CRM must also comply with ISO 17034. In case of conflict, ISO 17034 takes precedence.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of 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
heterogeneity
measured variation in compositions of elements measured from a group of specimens

Note 1 to entry: The contributions to heterogeneity include the uncertainties in the measurements from specimen to specimen, from micrometre to micrometre within each specimen, and from the test procedure itself.

3.2
research material
material that appears to have the physical and chemical characteristics required of a CRM, but which is to be examined in detail, including the determination of chemical composition, stability, and micro-heterogeneity and macro-heterogeneity, before certification as a CRM

3.3
stability
<general>resistance of a specimen to chemical and physical change during long-term storage at normal temperature and pressure

3.4
stability
<EPMA>resistance of the material to changes in chemical composition during electron bombardment, i.e. the resistance to change of the intensity of the relevant characteristic X-rays observed during the time the specimen is exposed to the electron beam

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