
**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)*



This document is a preview generated by EBS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Preparation of the research material	2
4.1 Selection of material	2
4.2 Preliminary inspection of the material	2
5 Heterogeneity of material	2
5.1 Sample preparation	2
5.2 Sample size	2
5.3 Test conditions	3
5.4 Test procedure	4
5.5 Statistical evaluation of data	4
5.6 Criteria for certification	8
6 Stability of the research material	8
7 Determination of the chemical composition of CRMs	9
7.1 Classification of CRMs	9
7.2 Determination of classification of CRMs	9
7.3 Selection of analytical method	9
7.4 CRM material tested by EPMA only	9
8 CRM specimen preparation, packaging, transportation, and storage	9
8.1 Preparation of CRM specimen	9
8.2 Packaging	9
8.3 Storage	10
8.4 Repolishing and recoating of CRMs	10
9 CRM certificate	10
9.1 Classification of CRM	10
9.2 Contents of the certificate	10
Annex A (informative) Spreadsheet instructions for the statistical evaluation of heterogeneity data	11
Annex B (normative) Suggested classification of CRMs for EPMA	14
Annex C (informative) Example of a certificate for EPMA CRMs	15
Bibliography	16

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 documents 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 202, *Microbeam analysis*, Subcommittee SC 2, *Electron probe microanalysis*.

This second edition cancels and replaces the first edition (ISO 14595:2003), which has been technically revised. It also incorporates Technical Correction ISO 14595:2003/Cor 1:2005.

Introduction

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

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

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

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

1 Scope

This International Standard gives 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.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO Guide 31:2000, *Reference materials — Contents of certificates and labels*

3 Terms and definitions

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

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

3.5

uncertainty

quantitative statement that provides a value for the expected deviation of a measurement from an estimate of the value of the specific measured quantity