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Surface chemical analysis — Secondary-ion mass spectrometry — Determination of relative sensitivity factors from ion-implanted reference materials

Analyse chimique des surfaces — Spectrométrie de masse des ions secondaires — Détermination des facteurs de sensibilité relative à l'aide de matériaux de référence à ions implantés

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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 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).

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

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 201, *Surface chemical analysis*, Subcommittee SC 6, *Secondary ion mass spectrometry*.

This second edition cancels and replaces the first edition (ISO 18114:2003), which has been technically revised.

The main changes compared to the previous edition are as follows:

— Formula (1) has been corrected;

— in Clause 5, Notes 1 and 2 have been modified.

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.

Introduction

Ion-implanted materials are commonly used in secondary-ion mass spectrometry for the calibration of instruments. This document was prepared to provide a uniform method for determining the relative sensitivity factor of an element in a specified matrix from an ion-implanted reference material, and to show how the concentration of the element in a different sample of the same matrix material can be determined.

Surface chemical analysis — Secondary-ion mass spectrometry — Determination of relative sensitivity factors from ion-implanted reference materials

1 Scope

This document specifies a method of determining relative sensitivity factors (RSFs) for secondary-ion mass spectrometry (SIMS) from ion-implanted reference materials.

The method is applicable to specimens in which the matrix is of uniform chemical composition, and in which the peak concentration of the implanted species does not exceed one atomic percent.

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 18115 (all parts), *Surface chemical analysis — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 18115 (all parts) apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Symbols and abbreviated terms

$C_i^{A,M}$	atomic concentration of the analyte element A in the matrix M at cycle i of a depth profile, expressed in atoms per unit volume
d	depth over which the depth profile is integrated, expressed in length units
$I_i^{A_j}$	detected count rates of the analyte ion of isotope A_j at measurement cycle i, expressed in counts per second
$I_i^{M_k}$	detected count rates of the reference isotope M_k at measurement cycle i, expressed in counts per second
I_{BG}	mean background count rate of species A_j, expressed in counts per second
N^{Aj}	fractional isotopic abundance of the analyte isotope A_j in the unknown sample
n	number of cycles over which the depth profile is integrated