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Second edition
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Microbeam analysis — Quantitative analysis using energy-dispersive spectrometry (EDS) for elements with an atomic number of 11 (Na) or above

Analyse par microfaisceaux — Analyse élémentaire quantitative par spectrométrie à sélection d'énergie (EDS) des éléments ayant un numéro atomique de 11 (Na) ou plus



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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

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 22309 was prepared by Technical Committee ISO/TC 202, *Microbeam analysis*.

This second edition cancels and replaces the first edition (ISO 22309:2006), of which it constitutes a minor revision. The main changes are as follows:

- the title has been modified to make it quite clear that the method is not suitable for light elements with an atomic number of less than 11;
- Subclause 6.2 has been modified to take into account the use of silicon drift detectors.

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Introduction

X-rays generated when a high-energy electron beam interacts with a specimen have energies (wavelengths) which are characteristic of the chemical elements (atom types) present in the specimen. The intensity of these X-rays from each element is related to the concentration of that element in the specimen. If these intensities are measured, compared with those from a suitable reference material or set of reference materials, and corrected in an appropriate manner, the concentration of each element can be determined. "Standardless" procedures also provide quantitative information, but involve a comparison with previously measured reference intensities that are stored within the software package or are calculated theoretically; such procedures may, depending on any assumptions made, be inherently less accurate than the method employing reference materials (see References [1] to [8] in the Bibliography). There are two common methods of detecting the characteristic X-rays that are produced, one which relies on wavelength dispersive spectrometry (WDS) and the other which uses energy-dispersive spectrometry (EDS). This International Standard relates to the latter, EDS.

Using EDS, the quantitative analysis of light elements (i.e. atomic number $Z < 11$, below Na) is more complex and some of the problems are discussed in this International Standard.