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Microbeam analysis — Scanning electron microscopy — Vocabulary

Analyse par microfaisceaux — Microscopie électronique à balayage — Vocabulaire

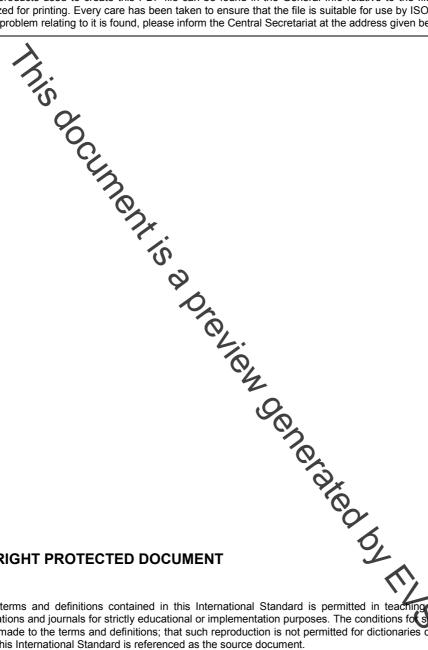


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Foreword

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 regulares approval by at least 75 % of the member bodies casting a vote.

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ISO 22493 was prepared by Technical Committee ISO/TC 202, *Microbeam analysis*, Subcommittee SC 1, *Terminology*.

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Introduction

The scanning electron microscopy (SEM) technique is used to observe and characterize the surface morphology and structure of solid materials, including metal alloys, ceramics, glasses, minerals, polymers, powders, etc., on a spatial scale of micrometer down to nanometer laterally. In addition, three-dimensional structure can be generated by using a combination of focused ion beam and scanning-electron-based analysis techniques. The SEM technique is based on the physical mechanism of electron optics, electron scattering and secondary electron emission.

As a major sub-field of microbeam analysis (MBA), the SEM technique is widely applied in diverse sectors (high-tech industries, basic industries, metallurgy and geology, biology and medicine, environmental protection, trade, etc.) and has a strong business base that needs standardization.

Standardizing the terminology of a technical field is one of the basic prerequisites for development of standards on other aspects of that field.

This International Standards is relevant to the need for an SEM terminology that contains consistent definitions of terms as they are used in the practice of scanning electron microscopy by the international scientific and engineering communities that simploy the technique. This International Standard is the second one developed in a package of standards on electron probe microanalysis (EPMA), scanning electron microscopy (SEM), analytical electron microscopy (AEM), energy-dispersive X-ray spectroscopy (EDS), etc., developed or to be developed by Technical Committee SO/TC 202, Microbeam analysis, Subcommittee SC 1, Terminology, to cover the complete field of MBA.

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Microbeam analysis — Scanning electron microscopy — Vocabulary

1 Scope

This International Standard defines terms used in the practice of scanning electron microscopy (SEM). It covers both general are specific concepts, classified according to their hierarchy in a systematic order, with those terms that have arready been defined in ISO 23833 also included, where appropriate.

This International Standard is applicable to all standardization documents relevant to the practice of SEM. In addition, some clauses of this International Standard are applicable to documents relevant to related fields (e.g. EPMA, AEM, EDS) for the definition of terms which are relevant to such fields.

2 Abbreviations

AEM analytical electron microscope/microscopy

BSE (BE) backscattered electron

CPSEM controlled pressure scanning electron microscope/microscopy

CRT cathode ray tube

EBIC electron beam induced current

EBSD electron backscatter/backscattering diffraction

EDS energy dispersive X-ray spectrometer/spectrome

EDX energy dispersive X-ray spectrometry

EPMA electron probe microanalyser/analysis

ESEM environmental scanning electron microscope/microscopy

FWHM full width at half maximum

SE secondary electron

SEM scanning electron microscope/microscopy

VPSEM variable-pressure scanning electron microscope/microscopy

3 Terms used in the physical basis of SEM

3.1

electron optics

science that deals with the passage of electrons through electrostatic and/or electromagnetic fields

3.1.1

electron source

device that generates electrons necessary for forming an electron beam in the electron optical system