
**Microbeam analysis — EMSA/MAS
standard file format for spectral-
data exchange**

*Analyse par microfaisceaux — Format de fichier standard EMSA/MAS
pour échange de données spectrométriques*



This document is a preview generated by EVS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2012

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing 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 General considerations	1
3 Format description	2
3.1 General.....	2
3.2 Required keywords.....	3
3.3 Spectral data.....	4
3.4 Optional keywords.....	5
3.5 Ending a file.....	8
4 Example of a data file in the EMSA/MAS spectral format	8
Bibliography	10

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 22029 was prepared by Technical Committee ISO/TC 202, *Microbeam analysis*.

This second edition cancels and replaces the first edition (ISO 22029:2003), which has been technically revised.

Introduction

The original EMSA/MAS Standard File Format for Spectral Data Exchange was published in October 1991. Since then, advances in both microbeam analysis techniques and in PC technology have meant that this original standard is not fully able to meet modern requirements. The members of ISO/TC 202 (the International Organization for Standardization Technical Committee for Microbeam Analysis) propose this updated version. Every effort has been made to only make those changes that improve or update the applicability of the standard, while minimizing incompatibility with the original version. The remit of TC 202 does not include surface analysis techniques, which are addressed by TC 201, and so references to these techniques have been removed from the original standard where necessary. The original document also included examples of coding and telecommunications protocols. Since these are now largely outdated, and not integral to the formatting of the data, these have also been removed.

It is noted that one of the originating societies (EMSA) has modified its name since the original document was published. The society is now officially known as the “Microscopy Society of America”, or MSA, the term “Electron” having been dropped to more fully indicate the work and interest of the membership of the society in all forms of microscopy.

Microbeam analysis — EMSA/MAS standard file format for spectral-data exchange

1 Scope

This International Standard presents a simple format for the exchange of digital spectral data that has been designated as an EMSA/MAS standard. This format is readable by both humans and computers and is suitable for transmission through various electronic networks, the phone system (with modems) or on physical computer storage devices (such as removable media). The format is not tied to any one computer, programming language or computer operating system. The adoption of a standard format would enable different laboratories to freely exchange spectral data, and would help to standardize data analysis software. If equipment manufacturers were to support a common format, the microscopy and microanalysis community would avoid duplicated effort in writing data analysis software.

2 General considerations

The virtues of a single standard data format have been admirably related by various authors^{[1],[2],[3],[4]}. It would often be convenient, after visiting another laboratory to use a different type of microanalytical spectrometer, to be able to return to one's own laboratory to analyse the data, or for a laboratory to be able to send a spectrum to another group at another location for analysis on their computer. A common format would also enable test spectra to be transported between data acquisition systems, in order to compare different data analysis routines, and would give users greater choice of analysis procedure, based on commercial or public-domain software.

Obviously, an ideal solution would be for the manufacturers to represent data in a standard format, but they are unlikely to agree on this without some direction from their customers (the microanalysis community). Therefore it is highly desirable for EMSA and MAS to proceed with the adoption of a standard format. Such a format does not preclude any research group or manufacturer from having their own, possibly proprietary, format. Spectral data can be stored internally in any format, as long as there is an option to convert it to the external standard (and vice versa) for the purposes of exchange. We believe that a standard format should possess the following attributes:

- a) It should be capable of representing the data exactly (without altering the scientific content).
- b) The format should be simple and easy to use.
- c) It must NOT be tied to any particular computer, programming language or operating system. It should work on a large number of computers of all sizes, although we cannot guarantee that it will work on all possible computers.
- d) The format should be both human and machine (computer) readable.
- e) It should be compatible with existing electronic communication networks and with the phone system (using modems). Future networks will likely retain compatibility with these.
- f) The format should support spectra of interest to the microanalysis community (such as XEDS, EELS, AES) and should be flexible enough to accommodate future data sets not yet specified.
- g) Each file should contain enough information to uniquely identify the type and origin of the spectral data and to reconstruct its significance.
- h) Where possible, the format should be compatible with various commercial data plotting or analysis programs (i.e. spreadsheets, or graphical-analysis packages).