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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 47105-2026

**Microbeam analysis - Standard file format for spectral-data
exchange**

微束分析 谱数据交换用标准文件格式

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is modified to adopt ISO 22029:2022 "Microbeam analysis - Standard file format for spectral data exchange by the American Society for Microscopy".

This document has undergone the following structural adjustments compared to ISO 22029:2022.

---The structure of Chapter 5, "Formatting Instructions," has been adjusted to include a hierarchical structure with bar numbering. Sections 5.1.1 to 5.1.5 correspond to ISO 22029.

Paragraphs 1-5 of section 5.1 in ISO 22022, and sections 5.2.1 and 5.2.2 correspond to paragraphs 1 and 2 of section 5.2 in ISO 22029:2022.

Sections 5.3.1 to 5.3.5 correspond to paragraphs 1 to 5 of section 5.3 in ISO 22029:2022, and sections 5.4.1 to 5.4.5 correspond to ISO 22029.

Paragraphs 1 to 5 of section 5.4 in 2022.

The technical differences between this document and ISO 22029:2022, and the reasons therefor, are as follows.

---Added the statement "This document applies to the storage and transmission of common spectral data in the field of microbeam analysis" to clarify the specific application areas of this document.

The domain was modified to better align with standard Chinese expression conventions and application requirements (see Chapter 1);

---The terms "keywords" and "checksum" have been added for better use of this document (see Chapter 3).

The following editorial changes have been made to this document.

---To align with existing standards, the standard name has been changed to "Standard File Format for Microbeam Analysis Spectral Data Exchange";

---The informative section in the scope of change is now a note (see Chapter 1);

---The abbreviation for energy dispersive spectrometer XEDS has been changed to EDS (see Chapter 4);

---The section in Chapter 4 of ISO 22029:2022 concerning industry background and discussion of existing solutions related to standard data formats has been removed.

The content should be appropriate to conform to the drafting rules of Chinese standards (see Chapter 4 of ISO 22029:2022);

---The explanatory text about data files in section 5.2.1 has been moved from the main text to the "Notes" section;

---The time zone example in Table 1 has been changed to a China time zone example;

---References have been added.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed and is under the jurisdiction of the National Technical Committee on Standardization of Microbeam Analysis (SAC/TC38).

Introduction

In October.1991, the American Microscopy Society (EMSA/MAS) published a standard file format for spectral data exchange, which ISO adopted as its standard.

Based on the original format, ISO 22029:2003 and ISO 22029:2012 were published respectively. With the development of microbeam analysis and computer technology, the original format...

It can no longer meet the requirements of modern technology. Therefore, ISO/TC202 (International Organization for Standardization Technical Committee on Microbeam Analysis) has released an updated version.

ISO 22029:2022.

To enhance the descriptive capabilities of instruments and analytical conditions, this document adds nine new keywords, while maintaining consistency with earlier versions of the data reader/writer.

Post-compatibility. A unified data format facilitates the analysis and exchange of spectral data between different laboratories, enables data transfer between acquisition systems, and provides...

More analytical options are available, and data archiving accessibility is guaranteed.

Previously, various spectral data formats existed in the field of microbeam analysis, but each had its limitations. The format proposed in this document draws on the format used in the field of infrared spectroscopy.

The JCAMP-DX format is simpler and features specialized capabilities for energy dispersive spectrometers (EDS), energy loss spectrometers (EELS), and Auger spectrometers (AES).

Function.

While ideally manufacturers would use this document format to represent data, this document format does not preclude manufacturers from using their own proprietary formats.

This format only requires that the manufacturer's proprietary format have the ability to convert to the format of this document.

Standard file format for exchanging microbeam analysis spectral data

1 Scope

This document provides a simple format for exchanging digital spectral data.

This document applies to the storage and transmission of common spectral data in the field of microbeam analysis.

Note: This document is provided in a format that is readable by both humans and computers and is suitable for storage via various electronic networks, telephone systems (with modems), or physical computers.

The data is transmitted via devices (such as removable storage media). This format is independent of any particular computer, programming language, or computer operating system.

Standard formats enable the free exchange of spectral data between different laboratories and contribute to the standardization of data analysis software. If equipment manufacturers also support this...

With a universal format, the microscopy and microbeam analysis team will avoid repeatedly writing data analysis software.

2 Normative references

This document has no normative references.

3 Terms and Definitions

The following terms and definitions apply to this document.

keywords

Identifiers that are predefined and have special meaning in computer languages.

Checksum

A binary segment obtained by performing some calculation on all bytes of the transmitted data.

Note: Used to detect errors during transmission.

4 General Requirements

The standard format for spectral data should ideally have the following attributes.

- a) It should be able to accurately represent the data (without changing the scientific content);
- b) It should be simple and easy to use;
- c) It is not dependent on any specific computer, programming language, or operating system, and can be widely used on computers of all sizes, but not...

We promise compatibility with all potential devices;

- d) Suitable for both human and computer use;
- e) It should be compatible with existing communication networks, and future networks may maintain compatibility with them;
- f) It should support common spectra in the field of microbeam analysis (such as EDS, EELS, AES) and be flexible enough to accommodate future uncertainties in data.

According to the collection;

- g) It should contain sufficient information to accurately identify the type and source of the