BUSINESS PLAN

ISO/TC 202
Microbeam analysis

EXECUTIVE SUMMARY

• As a modern basic instrumental analytical technique, microbeam analysis (MBA) involves world-wide commercial manufacturing & sale of MBA sophisticated instrumentation, covering Electron Probe Microanalysis (EPMA), Scanning Electron Microscope (SEM), Analytical Electron Microscope (AEM) and Energy Dispersive X-ray Spectroscope (EDX) etc., and operation & services of MBA laboratories (governmental ,commercial, academic or educational). MBA instrumentation and methodology are widely employed in quality management & assurance and R & D in basic and high-tech industries, covering metallurgy, chemical engineering, petroleum, semiconductor materials, micro-electronics, information technology, nano-technology etc., in testing and research in a great numbersectors of economy, technology and sciences. Quantitatively the overall scale of the markets addressed by the committee may be indirectly reflected in the following estimated world-wide figures over the past three years: 1) over 100,000 MBA instruments in operation; 2) over 50,000,000 MBA samples analyzed annually; 3) over 10,000 MBA instruments manufactured annually

• The benefits already realized or expected through the availability of the international standards developed or to be developed by the TC may be generalized as the international harmonization of the MBA analytical practices (including terminology, methodology, reference materials, instrument specification, laboratory accreditation, data processing & transfer etc.) to enable them to provide reliable, generally recognized, inter-comparable and inter-compatible results and data so as to facilitate international cooperation, interaction and trade in the relevant business sectors and public services.

• The main objectives of the international standardization work of the TC is to harmonize and guide MBA practices on an international basis through development of several packages of International Standards in several most mature sub-fields of MBA (EPMA, SEM, AEM and EDX) including several aspects (terminology, methodology, reference materials, instrument specification, laboratory accreditation, data processing & transfer etc.) prioritized according to their nature, state of the art of technique, urgency of need and availability of expert resources.

1 INTRODUCTION

1.1 ISO technical committees and business planning

The extension of formal business planning to ISO Technical Committees (ISO/TCs) is an important measure which forms part of a major review of business. The aim is to align the ISO work programme with expressed business environment needs and trends and to allow ISO/TCs to prioritize among different projects, to identify the benefits expected from the availability of International Standards, and to ensure adequate resources for projects throughout their development.

1.2 International standardization and the role of ISO

The foremost aim of international standardization is to facilitate the exchange of goods and services through the elimination of technical barriers to trade.

Three bodies are responsible for the planning, development and adoption of International Standards: ISO (International Organization for Standardization) is responsible for all sectors excluding Electrotechnical, which is the responsibility of IEC (International Electrotechnical Committee), and most of the Telecommunications Technologies, which are largely the responsibility of ITU (International Telecommunication Union).

ISO is a legal association, the members of which are the National Standards Bodies (NSBs) of some 140 countries (organizations representing social and economic interests at the international level), supported by a Central Secretariat based in Geneva, Switzerland.

The principal deliverable of ISO is the International Standard.

An International Standard embodies the essential principles of global openness and transparency, consensus and technical coherence. These are safeguarded through its development in an ISO Technical Committee (ISO/TC), representative of all interested parties, supported by a public comment phase (the ISO Technical Enquiry). ISO and its Technical Committees are also able to offer the ISO Technical Specification (ISO/TS), the ISO Public Available Specification (ISO/PAS) and the ISO Technical Report (ISO/TR) as solutions to market needs. These ISO products represent lower levels of consensus and have therefore not the same status as an International Standard.

ISO offers also the International Workshop Agreement (IWA) as a deliverable which aims to bridge the gap between the activities of consortia and the formal process of standardization represented by ISO and its national members. An important distinction is that the IWA is developed by ISO workshops and fora, comprising only participants with direct interest, and so it is not accorded the status of an International Standard.

2 BUSINESS ENVIRONMENT OF THE ISO/TC

2.1 Description of the Business Environment

The following political, economic, technical, regulatory, legal and social dynamics describe the business environment of the industry sector, products, materials, disciplines or practices related to the scope of this ISO/TC, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

Microbeam analysis (MBA) is a modern instrumental basic analytical technology utilizing election microbeam, ion microbeam and photon microbeam to probe and achieve in situ microanalysis on solid materials. It involves world-wide commercial manufacturing and sale of MBA instrumentation covering Electron Probe Microanalysis (EPMA), Scanning Electron Microscope (SEM), Analytical Electron Microscope (AEM) and Energy Dispersive X-ray Spectroscope (EDX), operation of MBA laboratories (governmental , commercial, academic or educational) and services of MBA practices. It is widely applied in almost all sectors of business, including high-tech manufacturing and service industries covering geological, metallurgical, environmental, biological, medical, agricultural and forensic studies and also relevant test and analysis in commodity inspection organization. In all these sectors, a considerable part of quality management & assurance depend on a critical assessment and characterization of the relevant products and materials on the micrometer and sub-micrometer scale.
Over the recent ten years, worldwide business community has seen:
- Increasing globalization in the high-tech business sector has led to its growing international technical cooperation, interaction and trade, which are expected to be facilitated by implementation of international standards on its diverse aspects including the relevant MBA practices involved. As a basic tool for quality management and assurance in high-tech materials, production and products, MBA is expected to find its respective areas of international standardization in this globalization trend.
- Increasing involvement of MBA in national and international public concerned management and control of the air, water and soil pollution of particulate materials produced by modern human industrial activities. These micro size solid pollutants can only be effectively identified for their behavior, traced for their origin and assessed for their harmfulness to human health by using MBA technology as a micro-characterization tool. This implies that an emerging need of international standardization on the relevant MBA methodology is expected.
- Nanotechnology is a fast growing area of research that is already having a major impact in diverse areas of science and technology such as protective paints and coatings, metal cutting tools, catalytic converters, hard discs, organic light emitting diodes for displays, advanced drug delivery systems, sun block creams etc. Estimates indicate that in 2005 the global market will be worth $105 billion rising to $700 billion by 2010. A key factor in these developments has been the ability to characterize material at the nanoscale in terms of its morphology, atomic structure and chemical composition. The use of microbeam techniques, such as electron microscopy, is one of the few ways in which this can be achieved but only if instruments are operating at peak performance, are well calibrated and both the methodology and data interpretation are of a high standard. TC202 and its subcommittee are already playing an important role in developing ISO standards to ensure that these conditions are met and in the future can be expected to develop standards dealing with specific aspects of nanoscale characterization.

Although MBA is a highly sophisticated technology, it has experienced major technical innovations through automation of instrumentation and computerization of data collection and reduction in their analytical process, which have led to its efficient utilization and general applicability for the end-users. Meanwhile, as professional experts had pointed out, the computerization of MBA has not reduced its inherent complexity and its automation does not necessarily mean unconditionally correct applicability. To achieve reproducible analytical data and results, it is essential that the development of computer software should be based on robustly standardized analytical procedures with the input of knowledge and experiences from professional experts in the relevant field of MBA worldwide. This may imply that for the sake of the international community as a whole, it is just the job of ISO/TC202 to pool the international expert resources to develop internationally standardized analytical protocols as the robust technical basis for developing MBA software. That will bring the MBA technical innovation into full play and bring full benefits to the international community of both the software developers and the end-users. However, as professional MBA experts had pointed out that the topic of MBA quantitative analysis is too broad and dynamic to define specific procedures, it is much more practical for TC202 to focus its standardization work on formulating universally applicable requirements for full and accurate documentation and testing,

against accepted MBA analytical standards, for existing and future quantitative MBA procedures. By directing the TC202 developed standards in this manner, the users can make an informed selection of a specific analysis program based on type of sample they are running and the level of the accuracy required.

While MBA, as a basic modern technology, is universally employed in all developed countries and most of the developing countries in the world as a whole, different scales and levels of its application and standardization are apparent in different countries. As quality management and assurance on a global scale is vital to international business and trade expansion, international harmonization of MBA analytical results through improvements to repeatability and reproducibility is essential and needed. There are very diverse areas of application with different possibility and necessity of harmonization in the field of MBA. ISO/TC202 is to address those specific areas where harmonization is in common need and interest and achievable through the development of international standards.

2.2 Quantitative Indicators of the Business Environment

The following list of quantitative indicators describes the business environment in order to provide adequate information to support actions of the ISO/TC:

Based on the estimated figures (for EPMA, SEM, AEM and EDX) come from China, Finland, France, Germany, Italy, Japan, Russia, United Kingdom and USA, representing the major part of world-wide business environment of MBA three years ago, the current quantitative indicators may be predictively expanded and be laid out on the following aspects:

- **MBA instruments in operation**

The total figures covering the above mentioned nine countries are estimated

for EPMA	as over 3,000
for SEM	as over 30,000
for AEM	as over 2,700
for EDX	as over 28,000

- **MBA samples analyzed annually**

The total figures covering the above mentioned nine countries are estimated

for EPMA	as over 375,000
for SEM	as over 39,000,000
for AEM	as over 288,000
for EDX	as over 1,530,000

- **MBA instruments manufactured annually**

The total figures covering the above mentioned nine countries are estimated

for EPMA	as over 260
for SEM	as over 2,415
for AEM	as over 315
for EDX	as over 2100

3 BENEFITS EXPECTED FROM THE WORK OF THE ISO/TC

As MBA is employed worldwide in diverse business sectors for their respective specific purposes, the benefits expected from the international standardization work of the ISO/TC202 may be described:

In general as to harmonize the analytical practices to enable them providing reliable, generally recognized, inter-comparable and inter-compatible results and data for facilitating international cooperation, interaction and trade in the relevant business sectors and public services, and *in specific* by listing some representative examples in the following aspects:

- **MBA terminology**

Standardized technical terms are the cornerstone of standards documentation. MBA terminology international standards are usually regarded as the prerequisite for the development of standards of other aspects and are to be cited as normative reference in other MBA International Standards under development and also in quite a number of national standards already developed with a view to achieving global harmonization in the technical terms.

- **MBA reference materials**

A wide variety of reference materials (RMs) are indispensable for almost all MBA compositional analytical practices, particular quantitative.

Many governmental research institutes (such as US's National Institute for Standards and Technology, NIST), instrument manufacturers and private RM companies worldwide have developed and continue to develop and use their own varieties of MBA RMs at very different levels of quality and certification, This leads to discrepancy in analytical results and incompatibility of analytical data in MBA practices and services employing RMs and is very disadvantageous to international technical cooperation and interaction in various business sectors.

Being aware of this situation, some national standardization bodies (such as CSBTS/China) have implemented, on a national basis, the standardization on technical specification, requirement, certification and use of MBA RMs by development and implementation of a series of national standards and have achieved national harmonization of MBA practices and results. It is therefore beneficial for the international community to have ISO/TC202 develop relevant international standards for technical specification, certification and use of MBA RMs to guide and harmonize the practices of developing and using them, because the RM providers can in this way develop their products expected to be recognized and utilized internationally with their limited resource once and for all while the MBA service providers can expect their result and data to be recognized and utilized internationally for the end-user.

In fact, European Community (EC) had taken the lead in international standardization on certified RMs organized by EURONORM on a regional international basis, It is the time to expend this trend to a worldwide international basis and to the MBA field.

MBA experts also point out that implementation of international standards developed by ISO/TC202 on testing and judgement of micro-homogeneity may bring a considerable number of existing RMs of ferrous alloys and others, which have been well certified in their composition but not micro-homogeneity, into use as international recognized MBA RMs and consequently benefit both RM developer and user.

- **MBA instrument specifications**

As indicated in section 2.2, there is quite a large scale of MBA instrumentation manufacturing and sale (including international trade) business worldwide, involving different manufacturers and widespread users in different countries. Different manufacturers have defined the common key items of technical specifications (e.g. microbeam size, resolution, etc.) of their MBA products in somewhat different ways and by test methods of their own, which have never been internationally recognized or inter-compatible with those of other manufacturers. This creates a situation of ambiguity on some key specifications of instrument, which are of crucial concern with the widespread users in the international market and actually affect the sale and utilization of the instruments in a global sense. It is in the interest of both the instrument producers and the users to have ISO/TC202 develop a series of international standards on MBA instrumental specifications (including their respective test methods) to provide the manufacturers with objective internationally recognized criteria for showing their competitive quality of products and consequently enhancing their international sales and at the same time to provide the users with the same objective criteria for evaluation acceptance of the instruments they purchase with high cost and expect to produce results and data up to international standard.

- **MBA laboratory accreditation**

There may be estimated 5000 MBA laboratories worldwide in various countries, operated by government organizations, academic institutions, universities, private companies, at different levels of proficiency, with different functions (basic research, R&D, quality control , inspectional analysis and routine analysis) serving various business sectors of the international community. The proficiency level of a laboratory depends on its instrumentation condition, personal competence and practice and technical management. International standards on MBA instrumentation, MBA methodology, MBA Reference Materials, developed by ISO/TC202, together with the related standards of ISO 9000 series will guide and help MBA laboratories to gain international accreditation.

• **MBA data processing and transfer**

Following the computerization of data collection and reduction in MBA analytical process, various kinds of software for MBA data processing and transfer have emerged from different source at different level of proficiency, reliability and applicability in different countries. As many MBA professional experts point out, some analytical software have been often developed on the basis of a "black box" philosophy without any analytical protocols defined or any analytical experiences described for the analysts and usually with unstandardized data transfer format. This cerates a very dubious situation for the produced data and is very inconvenience for the data transferring to the end-user. The ISO/TC202's work of standardization on MBA data processing and transferring through pooling the international expert resources to develop internationally standardized analytical protocols as the robust technical basis for developing MBA software will substantially bring benefits to both the software developers and the end-users.

• **MBA methodology**

MBA methodology may be divided into two categories:

❶ General (basic) methodology

This category of methodology depends only on MBA basic principles and deal with general analytical practices as a basis and guidance to the applied methodology. It is usually not involved in complexities of specific problems encountered in diverse applications in developing its international standards. The necessity, benefit and feasibility of its international standardization to be addressed by ISO/TC202 are obvious and need no further explanation.

❷ Applied (exclusive) methodology

This category of methodology highly depends on the applications to diverse business sectors and deal with specific objects and solves specific problems. Although development of international standards on that category of MBA methodology would be a more laborious job it has a closer link with market activities and would more directly bring public (trade, commercial, social, legal, environment etc.) benefits to the community of the respective business sectors.

4 REPRESENTATION AND PARTICIPATION IN THE ISO/TC

4.1 Countries/ISO members bodies that are P and O members of the ISO committee

The current participation status of TC 202 has updated with:

12 P-member bodies: Austria /ON, Belgium/IBN, China/CSBTS, Finland/SFS, France/AFNOR, Italy/UNI, Japan/JISC, Korea, Republic of /KNITQ, Russia/GOSTR, United kingdom/BSI, USA/ANSI and South Africa/SABS.

11 O-member bodies: Canada/SCC, Cuba/NC, Egypt/EOS, Germany/DIN, India/BIS, Ireland/NSAI, Norway/NSF, Poland/PKNMIJ, Romania/IRS, Singapore/SISIR and Turkey/TSE.

4.2 Analysis of the participation

There is an obvious imbalance between developed and developing countries in the P-participation which might reflect the areas of application and degree of standardization on MBA in the various countries; geographical location could also be a factor.

At present time, the most active P-members in TC 202 are China, Finland, France, Italy, Japan, Korea , Republic of , South Africa, UK and USA. Inactivity on the part of Austria, Belgium, Russia, and of the O-members Germany (once as a very active and contributive P-member) and others, probably stem from the lack of financial support and voluntary expertise that is available.
In support of its own activities, ISO/TC202 has maintained a close relationship (A liaison) with ISO/TC201, and an active relationship (B liaison) with the European Microbeam Analysis Society (EMAS), who have regularly contributed to the work of the committee.
There has been suggestion that some kind of liaison should be established with the Microbeam Analysis Society of America (MAS) and Microscopy Society of America (MSA), which are internationally impacting organizations.
There also has been suggestion that B liaison should be established with the newly organized International Federation of Microbeam Analysis Societies (IFMAS).
There seems to be lack of direct participation and representation of many concerned major MBA instrumentation companies via ISO/TC202 member bodies. The possible reasons may lie in the insufficient contact or communication with the companies.

5 OBJECTIVES OF THE ISO/TC AND STRATEGIES FOR THEIR ACHIEVEMENT

5.1 Defined objectives of the ISO/TC

The general objective of the international standardization work of ISO/TC202 is to harmonize and guide MBA practices on an international basis. The practices for each specific application of each MBA technique involve several aspects, including specimen preparation, reference material preparation and certification, instrument conditions and operation, data acquisition and reduction, quantification, etc. and different approaches will be necessary in different applications.
In this context, the specific objectives of ISO/TC202 have had to be organized on the basis of different MBA techniques stated in part 2.1. Those aspects, which are common to several of the techniques (e.g. terminology, data acquisition and reduction, data transfer, etc.) or common to different applications of each technique (specimen preparation, reference material preparation and certification, instrumentation, quantification, etc.), have been considered separately and priority has been given to these.
The current aim of the TC is to define the following series of International standards:

- MBA Terminology (including Terminology for EPMA*, SEM*, AEM and EDX)
- EPMA series (including Instrument specification*, laboratory condition, reference materials*, methodology, quantitative analysis in general* and in specific* application etc.)
- SEM series (including Instrument specification*, laboratory condition, reference materials, methodology, quantitative analysis in general and in specific application etc.)
- AEM series (including Instrument specification*, laboratory condition, reference materials, methodology*, quantitative analysis in general and in specific application etc.)
- EDX series (including Instrument specification*, laboratory condition, reference materials, methodology*, quantitative analysis in general* and in specific application etc.)
- Data management and treatment (including standard file format* etc.)

Among the above listed items those indicated with * are already being developed.

5.2 Identified strategies to achieve the ISO/TC's defined objectives

The diverse applications in the multitude of business sectors, coupled with the limited financial support and personnel resource available, has meant that all proposals have been and will be prioritized using the following criteria:
- Nature of the project, those of the basic nature and in common need (Terminology , instrument specification, laboratory condition, reference materials, data treatment, quantitative in general etc.) should be prioritized.

- State of the art of technique involved in the proposed project
- Its urgency of need
- Its estimated workload and expert resources ratio
- Some prioritized project may be too heavy to develop in terms of expert resources and time limit. It should be subdivided into a series of projects which are to be further prioritized according to the urgency of need. As an example, the project of terminology for MBA has been subdivided into a series of projects as EPMA, SEM, AEM and EDX in the order of priority.

In addition, the following strategies will be adopted:

- The TC structure will be adapted to accommodate necessary changes of the work program
- Plenary meetings to provide discussion of the TC activity will be held to maintain the momentum of the development process. Electronic mail will be used, together with a website to communicate with the TC community.
- Make full use of the electronic working environment of the TC on the ISOTC Server to keep all the relevant people within the TC community well informed of the latest situation regarding to work items and progress of other activities, problems, new developments etc. with a view to promoting the work progress.
- To make the work program management more efficient, in addition the “committee-interview ”facility on the ISOTC server for accessing to the information about alerts regarding actions expected by the TC, the TC hopes to establish within the TC an automatic "Countdown pre-warning" mechanism by Email to remind the TC relevant people of the timely action of voting on, commenting on and circulation of documents to keep adherence to the target dates.
- Continue to make maximum use of relevant standardization documents developed by other international or national organizations as a working base or even a CD for the "Fast track " process.
- Continue close liaison with ISO/TC201 in seeking joint efforts on developing international standards of common interest and exchanging work experience.
- Continue close liaison with EMAS in seeking its support of expert resources and advice on work program.
- Continue using a single language for meeting to obviate the problems and expense of organizing translation.
- Action will be taken to encourage TC member bodies to make direct contact with the worldwide major MBA instrumentation companies to promote their participation and representation in the TC activity.

6 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE ISO/TC WORK PROGRAMME

Past experience in TC work has shown that the following factors affected and likely will continue to affect completion and implementation of the work program.

- The field of activity of MBA is such that the work of the ISO/TC is relevant to international public need as a basic analytical tool and dose not have a direct link with the interest of certain economic or social groups that may offer substantial support. The cost of participating expert resources is covered by limited funding and this becomes a root factor leading to the following specifics:
- There may be a difficulty in finding project leaders who have the available resource to initiate and drive the work program
- Limited funding and availability of laboratories to participate may delay the co-normative research for the validation of test methods supporting the development of standards.
- Professional responsibility and workload of the participating experts may preclude the timely completion of scheduled work program and adherence to the target dates.
- Lack of relevant expert resources to many TC members for studying the circulated documents may affect their voting process or even lead to unreasonable abstention.
- Lack of travelling funds for relevant participating experts may affect the necessary representation of P-members in a TC meeting.

7 STRUCTURE, CURRENT PROJECTS AND PUBLICATIONS OF THE ISO/TC

This section gives an overview of the ISO/TC's structure, scopes of the ISO/TCs and any existing subcommittees and information on existing and planned standardization projects, publication of the ISO/TC and its subcommittees.

7.1 Structure of the ISO committee

TC 202 Microbeam analysis

Secretariat: China (SAC)

Secretary: Prof. Shouke Yan
Chair: Prof. Rongshu Zeng (China)

Participating countries: 12
Observer countries: 11

Participating countries
Austria (ON) Belgium (IBN) Finland (SFS) France (AFNOR) Italy (UNI) Japan (JISC) Korea, Republic of (KATS) Russian Federation (GOST R) South Africa (SABS) USA (ANSI) United Kingdom (BSI)

Observer countries
Canada (SCC) Cuba (NC) Egypt (EOS) Germany (DIN) India (BIS) Ireland (NSAI) Norway (SN)
Poland (PKN) Romania (ASRO) Singapore (SPRING SG) Turkey (TSE)

Other ISO and IEC committees in liaison ISO TC 201

International organizations in liaison: EMAS

TC 202/WG 5 - ISO/DIS 22309

TC 202/SC 1 Terminology

Secretariat: USA (ANSI)

Secretary: Dr. John A. Small
Chair: Dr. Dale E. Newbury (USA)

Participating countries: 9
Observer countries: 7

Participating countries: ,
Austria (ON) China (SAC) France (AFNOR) Japan (JISC) Korea, Republic of (KATS) Russian Federation (GOST R) South Africa (SABS) United Kingdom (BSI)
Observer countries:
Egypt (EOS) Finland (SFS) Germany (DIN) India (BIS) Italy (UNI) Norway (SN) Poland (PKN)

TC 202/SC 1/WG1 -ISO/DIS 23833

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TC 202/SC 2, Electron probe microanalysis

Secretariat: China (SAC)

Secretary: Ms. Wenfeng Zhu
Chair: Mr. Shijie Zhuang (China)

Participating countries: 11
Observer countries: 6

Participating countries: , Austria (ON) Finland (SFS) France (AFNOR) Italy (UNI) Japan (JISC) Korea, Republic of (KATS) Russian Federation (GOST R) South Africa (SABS) USA (ANSI) United Kingdom (BSI)
Observer countries:
Canada (SCC) Egypt (EOS) Germany (DIN) India (BIS) Norway (SN) Turkey (TSE)

TC 202/SC 2/WG 5 – ISO/CD 16592

TC 202/SC 2/WG 6 - ISO/CD 22489

TC 202/SC 3 Analytical electron microscopy

Secretariat: USA (ANSI)

Secretary: Dr. John Henry Scott
Chair: Dr. Eric B. Steel (USA)

Participating countries: *9*
Observer countries: 7

Participating countries:
Austria (ON) China (SAC) Finland (SFS) Japan (JISC) Korea, Republic of (KATS) Russian Federation (GOST R) South Africa (SABS) United Kingdom (BSI)
Observer countries: ,
Canada (SCC) Egypt (EOS) France (AFNOR) Germany (DIN) India (BIS) Italy (UNI) Norway (SN)

TC 202/SC 3/WG1 - ISO/CD 17270

TC 202/SC 4 Scanning electron microscopy (SEM)

Secretariat: Japan (JISC)

Secretary: Mr. Kimio Kanda
Chair: Mr. Masaki Saito (Japan)

Participating countries: 9

Participating countries: ,
China (SAC) Finland (SFS) France (AFNOR) Italy (UNI) Korea, Republic of (KATS) South Africa (SABS) USA (ANSI) United Kingdom (BSI)
Observer countries:

7.2 Current projects of the ISO technical committee and its subcommittees

TC 202 - Microbeam analysis

- ISO/DIS 22309 Microbeam analysis -- Quantitative analysis using energy dispersive spectrometry (EDS)

TC 202/SC 1 - Terminology

- ISO/DIS 23833 Microbeam analysis -- Electron probe microanalysis (EPMA) -- Vocabulary

TC 202/SC 2 - Electron probe microanalysis

- ISO/CD 16592 Microbeam analysis -- Electron probe microanalysis -- Determination of C content in Fe-C alloys using a calibration curve method
- ISO/CD 22489 Microbeam analysis -- Electron probe microanalysis -- Quantitative point analysis for bulk specimen using wavelength dispersive X-ray spectroscopy

TC 202/SC 3 - Analytical electron microscopy

- ISO/CD 17270 Analytical electron microscopy -- Test method to determine experimental parameters for electron energy loss spectroscopy (EELS)

7.3 Publications of the ISO technical committee and its subcommittees

Microbeam analysis

ISO 15632:2002 Microbeam analysis -- Instrumental specification for energy dispersive X-ray spectrometers with semiconductor detectors
ISO 22029:2003 Standard file format for spectral data exchange

TC 202/SC 2
ISO 14594:2003 Microbeam analysis -- Electron probe microanalysis -- Guidelines for the determination of experimental parameters for wavelength dispersive spectroscopy
ISO 14595:2003 Microbeam analysis -- Electron probe microanalysis -- Guidelines for the specification of certified reference materials (CRMs)
ISO 17470:2004 Microbeam analysis -- Electron probe microanalysis -- Guidelines for qualitative point analysis by wavelength dispersive X-ray spectrometry

TC 202/SC 4

ISO 16700:2004 Microbeam analysis -- Scanning electron microscopy -- Guidelines for calibrating image magnification

Reference information

Glossary of terms and abbreviations used in ISO/TC Business Plans

General information on the principles of ISO's technical work