IAEA

International Atomic Energy Agency Technical Meeting on

"Technical Meeting on the advanced analytical techniques for laboratory and industrial applications (TM-42593)

24-28 September 2012
IAEA Headquarters, Vienna, Austria
Meeting room A2712 (Building A)

ANNOUNCEMENT

BACKGROUND

Advanced analytical techniques based on **nuclear radiation** (photons, ions and neutrons) **probes** and technology, play a key role in analytical applications with a major impact on the socio economic development of the IAEA Member States. In **materials science** for example, advanced analytical techniques are used for the characterization of modern materials related with energy storage and conversion, thus helping economies with limited natural resources and energy supply in sustainable development. On the other hand, in Member States with intense exploration of mineral resources, advanced **environmental monitoring** techniques can support public health and minimize the adverse health effects by identifying and understanding pollution sources in Air Particulate Matter (APM) and toxic trace elements contamination in water, soil and biological systems. In **biomedical** related applications, advanced micro- or even nano- photon and ion probes can help in understanding drug delivery mechanisms and role of certain elements in diseases through the investigation of 2D, 3D intracellular distribution of elements, whereas precisely performed irradiation of individual cells in culture, or regions within cells, contributes to the radiotherapy and radiobiological research.

The advances in radiation sources (synchrotron radiation, ion-microprobe, spallation neutron sources) and the complexity of characterization needs for elemental/speciation/morphological analysis of bulk, 2D or 3D heterogeneous materials, investigation of surfaces, buried interfaces, etc within an extended range of spatial dimensions (from the mm down to nm scale) has supported the development of novel spectroscopy detectors (for example Multi-element and energy resolving imaging detector, multi-crystal spectrometers), experimental set-ups and methodologies such as:

- Grazing Incidence X-Ray Fluorescence analysis;
- High resolution X-ray and Rutherford Back Scattering spectrometry;
- Confocal X-ray spectrometry with photon and ion micro-probes;
- Micro-Tomography with photon and ion probes;
- Time of Flight Neutron Diffraction; and
- High energy ion implantation.

The laboratory applications with advanced analytical techniques are focused at first on the investigation of methodological aspects and assessment and optimization of their analytical performance (including optimization of the experimental parameters, range of applicability etc). In a second phase, techniques to be suitable for industrial applications are thoroughly characterized in

the laboratory to meet the industrial norms and requirements in terms of precision, accuracy, sensitivity, whereas detailed analytical protocols are established. A specific example of such a mature industrial application, one of the first developed at synchrotron radiation facilities, is the contamination control of various sizes (up to 300 mm) silicon wafers by means of TXRF analysis. Nowadays, a wide range of industrial applications are supported by different nuclear radiation probes and advanced analytical techniques; for example, applications in pharmaceuticals and biotechnology, mining, mineral exploration and mineral processing, semi-conductors, automotive, semi-conductors, metallurgy, cosmetics, bulk chemical synthesis utilizing synchrotron radiation, modification of light metals, high energy implantation for microelectronic applications, doping of semiconductors using ion-beams and finally using neutron beams in pharmaceuticals applications, chemical products and in high-end mechanical engineering for the nuclear and aerospace sectors.

OBJECTIVES

The Technical Meeting aims to provide a forum of discussion amongst specialists with the following objectives:

1. To review current status and trends in the development of advanced analytical techniques using nuclear radiation probes (X-rays, ion beams and neutrons);
2. To review current and future needs and requirements of industrial sector for advanced characterization of materials;
3. To define criteria and requirements for advanced analytical techniques to be utilized for industrial applications;
4. To support exchange and sharing of cross-cutting information and know-how between scientists working in R&D of analytical techniques and industrial applications;
5. To provide recommendations to IAEA and Member States how to support the advances in analytical techniques and to expand industrial applications as well as to and disseminate the relevant technologies; and
6. To prepare the proceedings of the meeting (Technical report).

PARTICIPATION

A person will be eligible to participate only if nominated by the Government of an IAEA Member State (Ministry of Foreign Affairs or National Atomic Energy Authority) or by an Organisation invited to participate. **Nomination** for participation (**Form A**) and title of contribution (**Form B**) with **abstract** should be received by the IAEA not later than **31 May 2012.** The participant should be a developer and/or user of advanced analytical techniques for laboratory and industrial applications.

SUBMISSION OF ABSTRACTS AND PAPERS

A contribution from the participant in the **form of a 1 page abstract** covering his/her work **relevant to the objectives of the meeting** will be necessary in order to be considered for participation.
Important: Contributors of material to be included in the Agency proceedings are required to grant the IAEA all copyrights or rights for publishing purposes.

The authors should make sure that the files do not include copyrighted fonts/materials or other impediments for reproduction.

The abstract shall be prepared according to the following instructions:

1) Page size: A4 (21 cm by 29.7 mm) – vertical orientation
2) Margins 25mm all around

3) Layout:

- Title: single-spaced, 14-point size, Times New Roman Font (TNR), **bold**
- Authors: single-spaced, 12-point size, TNR Font
- Affiliation: single-spaced, 12-point size, TNR Font, *italic*
- Text: 1.5 spaced, 12-point size, TNR Font
- Length: one page

Important: *In case of sending Microsoft Word files, authors should use True Type Embedded Fonts (when saving the file, click Tools, then Options, and tick Embed True Type fonts. This will help to prevent change of fonts when the file is read in a different system, as it will be in most of the cases).*

Full 5-10 pages papers are requested to be submitted prior to **15 September 2012** for inclusion in the TM report. Instructions for formatting the manuscripts will be posted in the TM web-site in due course, under guidelines on formatting papers.

FINANCIAL SUPPORT

The IAEA is generally not in a position to bear the travel and other costs of designated participants in the technical meeting. However, limited funds may be made available to assist the attendance of selected participants and approved in accordance with the current Agency rules and regulations. Generally, not more than one financial grant will be awarded to any one Member State. If Governments wish to apply for financial support on behalf of their nominees, they should address specific requests to the IAEA Scientific Secretary (**Form C**) whose coordinates are provided below.

MEETING FORMAT

To facilitate proceedings, participants are invited to contribute an oral presentation on a subject relevant to the scope and objectives of this meeting. Participants should submit an abstract of their proposed presentation along with their nomination. The working language of the meeting is English. No interpretation will be provided. It is expected that the meeting will start at 9:00 on Monday 24th September 2012 and conclude by 13:00 on Friday, September 28th 2012.

The outputs of discussions will be recorded for possible dissemination to Member States as an IAEA technical publication. Contributors of material to be included in the Agency proceedings are required to grant the IAEA all copyrights or rights for publishing purposes. Please complete and sign the **Form B and attach it to your abstract** and send it to the IAEA Scientific Secretary by post or email.

LOCAL ARRANGEMENTS

It is the responsibility of all participants to make their own travel arrangements to/from Austria. Detailed information on accommodation, local transport to/from the meeting venue, and other organisational details, will be sent to all designated participants well in advance of the meeting.

VISA

Designated participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of Austria well in advance of entry. An official letter of invitation will be issued to all designated participants by the IAEA Scientific Secretary.

DEADLINES

- **31 May 2012**: Submission of requests to the IAEA for participation (Forms A and B), financial support (Form C) and **abstract of the contribution**.
- **15 June 2012:** Participants informed of their acceptance of participation and request for financial support.
- **15 September 2012: Submission of a full paper**

IAEA SCIENTIFIC SECRETARY

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SECRETARIAL SUPPORT

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