

Workshop Registration

Measurement uncertainty of spark spectrometry

Name, First Name

Company

Department

Street

ZIP, City

Phone

Fax

Email

By registering for the workshop, you agree to the processing of your personal data for the workshop in accordance with the GDPR.

- I hereby consent to receiving the newsletter from TAZ GmbH.
Your personal data will not be disclosed to third parties.
You can revoke the newsletter at any time.

Date, Signature

Company stamp

Dates

22. & 23.02.2023 (2 days)
 28. & 29.06.2023 (2 days)
 18. & 19.10.2023 (2 days)

You will receive suggestions for accommodation with your registration confirmation. Please reserve your room with the respective accommodation ahead of time, as there may be shortages during trade fairs in Augsburg.

Registrations:

Fax +49 (0)8205 - 518 40 99
Email mthoma@tazgmbh.de



TAZ GMBH

WORKSHOP

Measurement uncertainty of spark spectrometry in theory and practice

22. & 23.02.2023
28. & 29.06.2023
18. & 19.10.2023

w [C %] = 0,421 ± 0,012

www.tazgmbh.de



Registrations and Informations

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REQUIREMENTS

Addressed are managing directors (GF), quality management officers (QM) and those responsible for determining measurement uncertainties, whose aim is to achieve a consistently high quality of the analysis results in accordance with current standard specifications.

Basic knowledge of spark spectrometry and statistics is not mandatory. These will also be taught on the first day of the seminar.

WORKSHOP OBJECTIVE

The workshops objective is to show practical options for determining measurement uncertainties in emission spectrometry. The necessary basics of emission spectrometry, the different types of certified reference materials and the statistical evaluation of measurement results are briefly explained.

Mainly, however, the requirements of the DAkkS for the calculation of measurement uncertainties are shown and practical solutions are suggested.

YOUR SPEAKERS



Thomas Asam,
Dipl.-Ing Physical Technology
TAZ GmbH



Moritz Winter,
Master of Science Materials Science
Damage analysis, Measurement uncertainties
TAZ GmbH

WORKSHOP SCHEDULE

DAY 1

8:30 - 9:00 a.m.: Thomas Asam

Introduction and welcoming of the participants

9:00 - 12:00 a.m.: Thomas Asam

Basics of spark spectrometry

- > Construction and functionality of a spark spectrometer
- > Excitation source: spark discharge, arc discharge, pulsed single spark evaluation
- > Optics (Rowland circuit, CCD, PMTs, primary slit, secondary slit)
- > distinguishing calibration, recalibration, type recalibration, weighting of standards
- > Interference Correction, Matrix Correction
- > Resolution

Break

1:15 - 3:15 p.m.: Thomas Asam

- > Determination of measurement uncertainty according to GUM, combined and extended measurement uncertainty
- > Reference materials: certified traceable, CRM, RM, SUS,
- > Similarities and differences, evaluation according to standard
- > Limit of detection LOD, limit of quantification LOQ, working range, BEC, Residual scatter of a calibration curve
- > Basics, structure and evaluation of quality control charts

Break

3:45 - 6:00 p.m.: Moritz Winter

Basics of Statistics

- > Average, median, standard deviation
- > Systematic and random deviations
- > Precision, Accuracy, Gaussian distribution
- > Robustness, expansion factors

DAY 2

8:30 - 12:00 a.m. Thomas Asam & Moritz Winter

& 1:30 - 4:00 p.m.:

- > Options for determining the measurement uncertainties according to standard specifications
 - >> Estimation of measurement uncertainties
 - >> Calculation algorithms according to standard specifications
- > Presentation of an **application** for automatic Determination of the measurement uncertainty according to standard specifications
- > Practical determination of measurement uncertainties according to standard specifications using the example of low-alloy steels, high-alloy steels, cast iron, high-speed steels, free-cutting steels, Aluminum alloys, copper alloys and more.

STANDARDS TO BE TRAINED

EURACHEM: Determination of the measurement uncertainty in analytical measurements

GUM: Evaluation of measurement data – Guide to the expression of uncertainty in measurement

ISO Guide 34: General requirements for the competence of reference material producers

ISO Guide 35: Reference materials: General and statistical principles for certification

BAM-Guide: Determination of measurement uncertainties in quantitative test results

PREIS

1.990,- Euro (plus 19 % VAT)

SERVICES

Included in admission:

- > Complete training materials
- > 2 group lunches
- > Dinner on the first day of the event
- > Documentation
- > Work on the devices
- > Certificate of participation according to ISO 9000ff

REGISTRATION

To register, please send the registration form back to us by fax or email.

REGISTRATION DEADLINE

2 weeks prior to the scheduled date

CANCELLATION

Please understand that if you cancel after receipt of the written registration, we will have to charge you 15% of the participation fee, unless you have registered a substitute participant.