CRITICAL REVIEW

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Improvements in the direct analysis of advanced materials using ICP-based measurement techniques
Andreas Limbeck,* Maximilian Bonta and Winfried Nischkauer

The analysis of advanced materials using ICP-based solid sampling approaches offers many advantages and possibilities. Recent developments are discussed in this review.

TUTORIAL REVIEW

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Inductively coupled plasma-mass spectrometry: insights through computer modeling
Annemie Bogaerts and Maryam Aghaei

We illustrate how modeling can give better insight in ICP-MS, by showing calculated plasma characteristics, gas flow patterns and sample behavior.
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**PAPERS**

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**Rapid high-resolution U–Pb LA-Q-ICPMS age mapping of zircon**

David M. Chew,* Joseph A. Petrus, Gavin G. Kenny and Niall McEvoy

$^{206}\text{Pb} - ^{238}\text{U}$ LA-ICPMS image map of a complex, polyphase zircon produced using 7 micron rasters.

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**Impact of Laser-Induced Breakdown Spectroscopy data normalization on multivariate classification accuracy**


Normalization of data is significant and should be chosen according to the sample matrix under investigation.

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**Imaging the 3D trace metal and metalloid distribution in mature wheat and rye grains via laser ablation-ICP-mass spectrometry and micro-X-ray fluorescence spectrometry**

Stijn J. M. Van Malderen, Brecht Laforce, Thibaut Van Acker, Laszlo Vincze and Frank Vanhaecke*

In this work, a serial sectioning approach, based on polishing an epoxy-embedded sample, is used to image trace metals in cereal grains in 3D.

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**Microanalysis of arsenic in solid samples by laser ablation-atomic fluorescence spectrometry**

Zdenka Člejkovec,* Johannes T. van Elteren, Vid S. Šelih, Martin Šala and Warren T. Corns

A spot mode-LA-AFS method has been developed for localised microanalysis of arsenic in biological tissues.
In situ Rb–Sr and K–Ca dating by LA-ICP-MS/MS: an evaluation of N₂O and SF₆ as reaction gases


Significant improvements to the analytics and calibration of in situ Rb–Sr dating; extending the concept to in situ K–Ca dating.

Iron isotopic analysis of finger-prick and venous blood by multi-collector inductively coupled plasma-mass spectrometry after volumetric absorptive microsampling

Yulia Anoshkina, Marta Costas-Rodríguez and Frank Vanhaecke*

The use of VAMS – volumetric absorptive microsampling – of finger-prick blood was evaluated in the context of high-precision isotopic analysis of whole blood Fe by multi-collector inductively coupled plasma-mass spectrometry.

Development and validation of a new method for the precise and accurate determination of trace elements in silicon by ICP-OES in high silicon matrices

A. Rietig and J. Acker

A ready-to-use method for the precise and fast determination of impurities in silicon is presented.

FPM model calculation for micro X-ray fluorescence confocal imaging using synchrotron radiation

I. Szalóki,* A. Gerényi, G. Radócz, A. Lovas, B. De Samber and L. Vincze

A novel quantitative reconstruction model for synchrotron-based confocal X-ray fluorescence imaging has been developed and validated.
Influence of the target material on secondary plasma formation underwater and its laser induced breakdown spectroscopy (LIBS) signal

M. R. Gavrilović, V. Lazic and S. Jovičević

The significant influence of the target material properties on subsequent plasma and bubble formation in underwater laser ablation is demonstrated through the examples of α-alumina and pure Al targets.

Combined hollow cathode vs. Grimm cell: semiconductive and nonconductive samples

A. Gubal,* A. Ganeev, V. Hoffmann, M. Voronov, V. Brackmann and S. Oswald

The Grimm and the combined hollow cathode GD cells were compared in the scope of semiconductive and nonconductive sample analysis.

Optimization of distances between the target surface and focal point on spatially confined laser-induced breakdown spectroscopy with a cylindrical cavity

Jin Guo, Junfeng Shao, Tingfeng Wang, Changbin Zheng, Anmin Chen* and Mingxing Jin*

The spatial confinement effect in laser-induced plasma with different distances between the target surface and focal point is investigated by optical emission spectroscopy.

Determination of total Hg isotopic composition at ultra-trace levels by on line cold vapor generation and dual gold-amalgamation coupled to MC-ICP-MS


An online pre-concentration method was developed to directly determine Hg isotopic compositions at the ng L\(^{-1}\) level in liquid samples.
Structure of the Fe and Ni L X-ray spectra

A. Sepúlveda, T. Rodríguez, P. D. Pérez, A. P. L. Bertol, A. C. Carreras, J. Trincavelli, M. A. Z. Vasconcellos, R. Hinrichs and G. Castellano*

Diagram and satellite line parameters were obtained from Fe-L and Ni-L X-ray spectra induced by electron impact.

Measurement of uranium-236 in particles by secondary ion mass spectrometry

David S. Simons* and John D. Fassett

The determination of the relative isotopic abundance by secondary ion mass spectrometry of $^{236}\text{U}$ in uranium-containing material is complicated by the presence of $^{235}\text{U}^{+}$ ions at the same nominal mass as the uranium isotopic peak.

3D-reconstruction of chemical state distributions in stratified samples by spatially resolved micro-X-ray resonant Raman spectroscopy


X-ray resonant Raman scattering was used, for the first time, in a confocal setup with the aim of determining different compounds of the same element in a copper-multilayer sample.

A new approach for the digestion of diesel oil by microwave-induced combustion and determination of inorganic impurities by ICP-MS

Flavia M. Dalla Nora, Sandra M. Cruz, Cristiano K. Giesbrecht, Günter Knapp, Helmar Wiltsche, Cezar A. Bizzi, Juliano S. Barin and Erico M. M. Flores*

The presence of trace elements in fuels with high vapor pressure, such as diesel oil, can cause several problems, such as the poisoning of automotive catalysts and environmental pollution; thus strict quality control is required.
Inter-calibration of a proposed new primary reference standard AA-ETH Zn for zinc isotopic analysis

Corey Archer,* Morten B. Andersen, Christophe Cloquet, Tim M. Conway, Shuofei Dong, Michael Ellwood, Rebekah Moore, Joey Nelson, Mark Rehkämper, Olivier Rouxel, Moneesha Samanta, Ki-Cheol Shin, Yoshiki Sohrin, Shotaro Takano and Laura Wasylenki

We have prepared and calibrated a large volume of pure, concentrated and homogenous zinc standard solution.