

2014 Denver X-ray Conference
******As of April 8th 2014 and Subject to Change**
 See <http://www.dxcicdd.com/> for up to date information
Program-at-a-Glance ♦ Monday – Friday ♦ 28 July – 1 August

Monday Morning Workshops 9:00 am – 12:00 Noon				
Meeting Room				
	North Mammoth	South Mammoth	Roosevelt Amphitheatre	Cheyenne or Obsidian/Dunraven
XRD	Rietveld (Kaduk)	Two-dimensional Detectors (He/Blanton)		
XRF			Basic XRF (Drews)	Trace Analysis (Wobrauschek/Streli) Cheyenne
Monday Afternoon Workshops 1:30 pm – 4:30 pm				
XRD	Electron Backscatter Diffraction (Wheaton)	Introduction to Modulated Structures (Gourdon/Kabekkodu/Sagnella)		
XRF			Sample Preparation (Anzelmo)	XRF Imaging (Tsuji) Cheyenne
Monday Evening XRD Poster Session & Reception 5:00 – 7:00 pm. Huntley Dining Room (Watkins)				
Tuesday Morning Workshops 9:00 am – 12:00 Noon				
XRD	Line Profile Analysis (Ungar/Cernatescu)	Quantifying Crystalline and Amorphous Phases I (Kern)		
XRF			Quantitative Analysis I (Mantler)	Energy Dispersive XRF (Phillips) Obsidian/Dunraven
Tuesday Afternoon Workshops 1:30 pm – 4:30 pm				
XRD	Texture (Schaeben)	Quantifying Crystalline and Amorphous Phases II (Kern)		
XRF			Quantitative Analysis II (Mantler)	Micro XRF (Havrilla) Obsidian/Dunraven
Tuesday Evening XRF Poster Session & Reception 5:00 – 7:00 pm. Huntley Dining Room (Brehm/Schmeling)				
Wednesday Morning Plenary Session 8:30 am – 11:45 pm. X-rays on Mars (Elam/Blanton) Huntley Dining Room				
Wednesday Afternoon Sessions				
Special Topics	New Developments in XRD & XRF Instrumentation (Blanton/Fawcett) (12:30 – 5:00)			
XRD		Texture Measurements with X-rays, Electrons & Neutrons (Wheaton) 1:30 – 4:50		
XRF			General XRF (Burns) 12:30 – 4:40	Micro XRF (Havrilla) 1:00 – 5:00 Obsidian/Dunraven
Wednesday Evening Vendor Sponsored Reception 5:30 – 7:00 pm. Exhibit Hall/Yellowstone Conference Center				
Thursday Morning Sessions				
Special Topics				Rechargeable Battery Characterization (Rodriguez) 9:00 – 11:50 Obsidian/Dunraven
XRD	Nuclear Materials (Brown/Sisneros) 8:30 – 12:30	Rietveld Analysis (Kaduk) 8:30 – 12:20		
XRF			Industrial & Hand Held Applications of XRF (Anzelmo/Seyfarth) 8:30-12:00	
Thursday Vendor Meeting 12:30-1:00 pm. Gibbon & Lamar Rooms.				
Thursday Afternoon Sessions				
XRD	Line Profile Analysis (Ungár/Cernatescu) 1:30 – 3:20	Applied Materials Analysis (Blanton/Fawcett) 1:55 – 5:00		
XRF			Fast Element & Species-specific Imaging (Havrilla/Janssens) 1:20 – 5:00	Trace Analysis (Zaitz) 1:30 – 5:00 Obsidian/Dunraven
Friday Morning Sessions				
XRD	Stress Analysis (Watkins) 8:30 – 12:10	Small Angle X-ray Scattering for Nanomaterials Characterization (Høghøj) 8:30-11:20		
XRF			Quantitative Analysis (Brehm) 8:30 – 12:10	Environmental & Geological Apps. (Miranda/Van Grieken) 8:30 – 12:30 Obsidian/Dunraven

2014 Denver X-ray Conference Workshops

Morning workshops – 9:00 am – 12 noon

Afternoon workshops – 1:30 pm – 4:30 pm

Monday Morning Workshops 9:00 am – 12:00 Noon

Rietveld - North Mammoth

Organizer & Instructors and description to be announced.

Two-dimensional Detectors - South Mammoth

Organizer & Instructors:

T. Blanton, ICDD, Newtown Square, PA, tblanton@icdd.com

B.B. He, Bruker AXS, Inc. Madison, WI, bob.he@bruker-axs.com

M. Fransen, PANalytical B.V., Almelo, The Netherlands

J. Ferrara, Rigaku Americas Corp., The Woodlands, TX

Two-dimensional diffraction data contains abundant information about the atomic arrangement, microstructure, and defects of a solid or liquid material. In recent years, the use of two-dimensional detectors has dramatically increased in academic, government and industrial laboratories. This workshop covers recent progress in two-dimensional X-ray diffraction in terms of detector technology, geometry and configuration of the two-dimensional diffractometer. Various applications such as phase ID, texture, stress, crystallinity, combinational screening and thin film analysis will be discussed.

Basic XRF - Roosevelt Amphitheatre

Organizer & Instructors:

A.R. Drews, Ford Motor Company, Dearborn, MI, adrews@ford.com

G.J. Havrilla, Los Alamos National Laboratory, Los Alamos, NM

This workshop provides a basic introduction to the principles of XRF specifically aimed at those new to the field. In the first half, there will be a general overview of the XRF technique, including a discussion of the basic principles. The emphasis in the first half will be on understanding the underlying physical phenomena, how the technique is applied, optimization of the signal and approaches to quantitative analysis. In the second half of the workshop, examples of real-world applications will be presented to illustrate some of the challenges and opportunities that the analyst may face. This half will describe a variety of specimen formats and demonstrate the flexibility of the XRF technique.

Trace Analysis - Cheyenne

Organizers & Instructors:

C. Strelj, TU Wien, Atominstitut, Wien, Austria, strelj@ati.ac.at

P. Wobrauschek, TU Wien, Atominstitut, Wien, Austria, wobi@ati.ac.at

K. Tsuji, Osaka City University, Osaka, Japan

N. Kawahara, Rigaku Corporation, Osaka, Japan

Both beginners and experienced X-ray physicists should gain information by attending the trace analysis workshop. Presentations of most modern techniques and instrumentation for trace element analysis using EDXRS will be given. Physical methods to improve minimum detection limits in XRF by background reduction will be discussed; special emphasis will be on Synchrotron radiation as excitation source. Introduction to total reflection XRF (TXRF)

and actual instrumentation will show achievable advantages and results in terms of detection limits, sensitivities and detectable elemental range down to light elements (eg. Carbon). Confocal μ -XRF will be presented as method for 2D and 3D spatial resolved elemental imaging with emphasis on Trace Analysis. Applications from interesting scientific fields as environment, microelectronics, forensic, and life science will show the successful use of the importance of the various XRF spectrometric techniques. The possibilities of trace analysis using Wavelength dispersive XRF will also be covered, showing the benefits and limitations of the technique. A comparison of achievable detection limits with the various techniques on some specific samples will be discussed.

Monday Afternoon Workshops 1:30 pm – 4:30 pm

Electron Backscatter Diffraction - North Mammoth

Organizer & Instructors:

B. Wheaton, Corning Incorporated, Corning, NY, wheatonbr@corning.com

S. Wright, EDAX/Ametek, Draper, UT, stuart.wright@ametec.com

Electron Backscatter Diffraction, EBSD is a powerful scanning electron microscope based microstructural crystallographic characterization technique that provides quantitative crystallographic analysis at the surface of bulk samples. EBSD can provide crystallographic information with spatial resolutions as small as tens of nanometers, including phase type and phase distribution, global and local texture, defects, microstrain and grain size. The technique has become highly automated and data acquisition rates are becoming increasingly rapid resulting in detailed maps showing a wealth of crystallographic information over large areas of a sample. EBSD is firmly established as a critical tool for the quantitative characterization of crystalline samples and is used extensively in many materials research and industrial institutions. The technique is highly complementary to X-ray diffraction in providing fundamental crystallographic information for many material types including metals, ceramics and geological specimens. This workshop will provide a basic overview of EBSD including theory, sample preparation requirements and the types of data that can be obtained along with examples.

Introduction to Modulated Structures - South Mammoth

Organizer & Instructor: **O. Gourdon**, Los Alamos National Laboratory, Los Alamos, NM, gourdon@lanl.gov

S. Kabekkodu, D. Sagnella, International Centre for Diffraction Data, Newtown Square, PA, suri@icdd.com, sagnella@icdd.com

Crystal systems that form modulated structures are a fascinating class of materials that lack conventional lattice periodicity but are still perfectly long-range ordered. Such systems exist across the whole range of chemical disciplines from organic conductors and minerals to ceramic materials like high- T_c superconductors and ferroelectrics.

The purpose of this half-day workshop is to present an overview of the methods of structure determination and structural analysis of incommensurately modulated structures and composite crystals. This introductory workshop is aimed at scientists that have limited or no experience with modulated structures. Lectures will cover the basic principles of the superspace description of modulated structures. The participants will also have the opportunity to study step by step some structure refinement(s) using the computer program JANA2006 (written by V. Petricek, M. Dusek, and L. Palatinus, Prague).

Sample Preparation of XRF - Roosevelt Amphitheatre

Organizer & Instructors:

John Anzelmo, Anzelmo & Associates, Inc., Madison, WI, jaanzelmo@aol.com

Chantal Audet, Corporation Scientifique Claisse, Quebec City, Quebec, Canada

Larry Arias, Bruker, Madison, WI

This workshop will begin with John Anzelmo discussing the fundamental physics of sample preparation such as infinite thickness and effective layer thickness, particle size effects, mineralogical effects, grinding concepts and

how to make the basic laboratory operations involved in solving these problems for XRF specimen preparation of pressed powders and fusion beads. Larry Arias will discuss the concepts involved in sample preparation techniques for liquids and pressed powders. Chantal Audet will discuss basic and advanced fusion techniques such as selection of flux for different applications, conditions that cause cracking in beads, and oxidation techniques for simple and difficult to flux materials.

XRF Imaging - Cheyenne

Organizer & Instructor:

K. Tsuji, Osaka City University, Osaka, Japan, tsuji@a-chem.eng.osaka-cu.ac.jp

U. Fittschen, University of Hamburg, Hamburg, Germany

K. Sakurai, NIMS, University of Tsukuba, Tsukuba, Japan

P. Pianetta, Stanford University, Menlo Park, CA

Various techniques for X-ray imaging employing either scanning or projection modes both at synchrotron radiation facilities and in the laboratory will be introduced. In the scanning mode, elemental images are obtained through XRF analysis using a micro X-ray beam that is scanned across the sample with the spatial resolution determined by the size of the beam. This method has found wide application but can have throughput limitations depending on the brightness of the X-ray source and the size of the X-ray spot. Recent developments in zone plate X-ray optics and sensitive 2D detection schemes have made projection type X-ray imaging a practical tool. Such transmission X-ray microscopes can be used in 2D and 3D nanometer-scale imaging applications using laboratory sources while synchrotron sources broaden the applications to high-speed elemental and spectroscopic imaging. Additional spectroscopic techniques, such as selective excitation and wavelength dispersive XRF imaging, will be also applied to obtaining elemental images. A color X-ray camera with photon counting analysis will be introduced along with compelling applications. Merits and drawbacks of these techniques will be reviewed.

Tuesday Morning Workshops 9:00 am – 12:00 Noon

Line Profile Analysis - North Mammoth

Organizers & Instructors:

T. Ungár, University of Hong Kong, Hong Kong and Eötvös University Budapest, Hungary, ungar@ludens.elte.hu

I. Cernatescu, Pratt and Whitney, East Hartford, CT, Iuliana.cernatescu@pw.utc.com

L. Balogh, Queen's University, Kingston ON, Canada

X-ray and neutron diffraction line profile analysis (LPA) is one of the most powerful methods to characterize the substructure of crystalline materials in terms of dislocations crystallite-size and planar defects. The purpose of the workshop will be to present the technical details of the application of LPA to determine the type and character, and the number density of lattice defects in different structural materials, ceramics, geological minerals and nanocrystalline materials. Special emphasis will be given to the synergy between different electron microscopy methods and LPA. Possibilities and requirements for conventional θ - 2θ laboratory X-ray diffraction experiments, synchrotron facilities and recent developments offered by neutron diffraction will be revealed for the purpose of LPA. The software package of convolutional multiple whole profile analysis (CMWP) will be presented along with showing specific case studies. Participants are encouraged to bring along their own diffraction patterns for analysis with the expert assistance of the instructors.

Quantifying Crystalline and Amorphous Phases I (Full Day) - South Mammoth

Organizer & Instructors:

A. Kern, Bruker GmbH, Karlsruhe, Germany, Arnt.Kern@bruker-axs.de

I. Madsen, CSIRO Process Science and Engineering, Melbourne, Australia

M. Raven, CSIRO Land and Water, Adelaide, Australia

P. Whitfield, Oak Ridge National Laboratory, Oak Ridge, TN

This workshop will discuss the basis of quantitative phase analysis (QPA) for both single peak and whole pattern approaches. The focus will be on how to select and apply these methods, particularly in the context of the derivation of absolute phase abundances. The presence of poorly crystalline or amorphous content requires extension of the basic methods, but, once these are established, they can be shown to produce QPA to the similar lower limits of detection and accuracy as for crystalline phases. Worked examples for various methods will be presented using both mineralogical as well as pharmaceutical samples.

Morning: Methodology

- Basis: QPA of crystalline and amorphous phase abundance
- Methods for QPA
- Practical Assessment of Merits of Methods for QPA

Afternoon: Towards one weight percent accuracy

- How to assess accuracy
- Minimising systematic errors
- Use of constraints and restraints

Quantitative Analysis I (Full Day) - Roosevelt Amphitheatre

Organizer & Instructors, morning and afternoon sessions:

M. Mantler, Rigaku Corporation, Japan, michael.mantler@rigaku.com

W.T. Elam, University of Washington, Seattle, WA

B. Vrebos, PANalytical B.V, Almelo, The Netherlands

Morning: Basic Methods and Resources

1. Classical fundamental parameters and mathematical models.
2. Empirical and theoretical influence coefficients.
3. Fundamental parameter collections and tube spectra: Sources, availability, and reliability.

Afternoon: Advanced Methods

1. Compensation methods (standard addition, internal standard, heavy absorber, Compton scattering).
2. Layered materials, inhomogeneous samples, and rough surfaces.
3. Light elements. Heavy elements in a light matrix. Trace element analysis. Analysis using L- and M-lines (including Coster Kronig contributions, cascade effects).
4. Interpretation of spectra: Obtaining net intensities; artefacts.

Energy Dispersive XRF Spectroscopy - Obsidian/Dunraven

Organizer & Instructors:

R. Phillips, Thermo Scientific, West Palm Beach, FL, rich.phillips@thermofisher.com

P. Lemberge, Thermo Scientific, Ecublens, Switzerland, pascal.lemberge@thermofisher.com

This workshop is designed to provide a discussion of the theoretical and practical aspects of EDXRF spectrometry providing a comprehensive review of the basic fundamentals for both the beginner and experienced X-ray spectroscopist. Topics to be covered include instrumentation, components, and applicability of EDXRF; ease of use; rapid qualitative analysis and material screening; calibration techniques for quantitative analysis; standard-less analysis; sensitivity of EDXRF for a wide variety of elements in various matrices; and sample preparation. A variety of applications will be presented as real-life examples where EDXRF is being used to solve complex analytical problems. The major emphases will be applicability of EDXRF and the optimal protocol for generating and reporting of reliable experimental results.

Tuesday Afternoon Workshops 1:30 pm - 4:30 pm

Texture - North Mammoth

Organizer & Instructors:

H. Schaeben, Geophysics and Geoinformatics, TU Bergakademie Freiberg, Germany

J.-J. Fundenberger, LEM3, Université de Lorraine, Metz, France

Dr. Karsten Kunze, Scientific Center for Optical and Electron Microscopy (ScopeM) ETH, Zurich, Switzerland

F. Bachmann, TU Bergakademie Freiberg, Freiberg, Germany

Texture is concerned with the statistical and spatial distribution of crystallographic orientations within multiphase and polycrystalline specimens. It is a constitutive material characteristic and determines in first order approximation its behavior except for grain boundary effects. The workshop will address

- diffraction experiments (X-ray, synchrotron, neutron, electron back-scatter) providing either integral pole intensity data or individual orientation data, including ODF-adaptive texture goniometry,
- mathematical models, numerical methods and software to analyze and interpret the orientation data, in particular to determine the orientation density function (ODF), its Fourier coefficients and other characteristic entities, associated mis-orientation distributions,
- examples of applications, e.g. determination of anisotropic tensorial material properties.

It is emphasized that spatially resolving EBSD orientation data take texture analysis far beyond its classical tasks towards a comprehensive fabric analysis as envisioned by Sander including reconstruction of crystallites and their boundaries, mis-orientation analysis, classification of grain boundaries, grain size distribution, grain shape analysis and other features.

Quantifying Crystalline and Amorphous Phases II (Full Day) - South Mammoth

Organizer & Instructors:

A. Kern, Bruker GmbH, Karlsruhe, Germany, Arnt.Kern@bruker-axs.de

I. Madsen, CSIRO Process Science and Engineering, Melbourne, Australia

M. Raven, CSIRO Land and Water, Adelaide, Australia

P. Whitfield, Oak Ridge National Laboratory, Oak Ridge, TN

This workshop will discuss the basis of quantitative phase analysis (QPA) for both single peak and whole pattern approaches. The focus will be on how to select and apply these methods, particularly in the context of the derivation of absolute phase abundances. The presence of poorly crystalline or amorphous content requires extension of the basic methods, but, once these are established, they can be shown to produce QPA to the similar lower limits of detection and accuracy as for crystalline phases. Worked examples for various methods will be presented using both mineralogical as well as pharmaceutical samples.

Morning: Methodology

- Basis: QPA of crystalline and amorphous phase abundance
- Methods for QPA
- Practical Assessment of Merits of Methods for QPA

Afternoon: Towards one weight percent accuracy

- How to assess accuracy
- Minimising systematic errors
- Use of constraints and restraints

Quantitative Analysis II (Full Day) - Roosevelt Amphitheatre

Organizer & Instructors, morning and afternoon sessions:

M. Mantler, Rigaku Corporation, Japan, michael.mantler@rigaku.com

W.T. Elam, University of Washington, Seattle, WA

B. Vrebos, PANalytical B.V, Almelo, The Netherlands

Morning: Basic Methods and Resources

4. Classical fundamental parameters and mathematical models.
5. Empirical and theoretical influence coefficients.
6. Fundamental parameter collections and tube spectra: Sources, availability, and reliability.

Afternoon: Advanced Methods

5. Compensation methods (standard addition, internal standard, heavy absorber, Compton scattering).
6. Layered materials, inhomogeneous samples, and rough surfaces.
7. Light elements. Heavy elements in a light matrix. Trace element analysis. Analysis using L- and M-lines (including Coster Kronig contributions, cascade effects).
8. Interpretation of spectra: Obtaining net intensities; artefacts.

Micro XRF - Obsidian/Dunraven

Organizer & Instructors:

G.J. Havrilla, Los Alamos National Laboratory, Los Alamos, NM, Havrilla@lanl.gov

J. Kawai, Kyoto University, Kyoto, Japan

N. Gao, X-ray Optical Systems, East Greenbush, NY

I. Mantouvalou, Technical University of Berlin, Berlin, Germany

The MXRF workshop will provide an overview of how micro X-ray fluorescence can be used in the laboratory to solve analytical problems. This overview will include a look at the optics needed to do MXRF, capabilities of the instrumentation including confocal MXRF and monochromatic wavelength dispersive XRF, and quantification issues regarding area mapping, depth profiling as well as precision and accuracy.

XRD Poster Session – Monday Evening, 28 July - **Signifies Presenting Author, when noted*

The Monday evening XRD Poster Session will be held 5:00 – 7:00 pm in the Huntley Dining Room, in conjunction with a Wine & Cheese Reception.

Judge: T.R. Watkins, Oak Ridge National Laboratory, Oak Ridge, TN
Three “Best Poster” awards will be given at the end of the session, including “Best Student Poster”.

D-6 Structural study of the Ball-milled Cr₈₀Co₂₀ Alloy by the Rietveld Refinement of XRD Profiles

S. Loudi, Université 20 Août 1955, Skikda, Algérie

F.-Z. Bentayeb, Université Badji-Mokhtar, Annaba, Algérie

J.J. Sunol, L. Escoda, Universitat de Girona, Girona, Spain

D-9 Free and Open Source Matlab® Toolbox MTEX for Texture Analysis and Beyond

F. Bachmann, H. Schaeben*, TU Bergakademie Freiberg, Germany

R. Hielscher, TU Chemnitz, Germany

D. Mainprice, Université Montpellier 2, France

D-10 Highly Dispersed Platinum Nanoparticles Supported on Silica for Hydrogen Evolution Electrocatalyst

N.H. Khdarya, KACST, Riyadh, KSA

M.A. Ghanem, KSU, Riyadh, KSA

D-11 Crystallite Size Determination: A Comparison of Approaches and Methods

M.E. Light, University of Southampton, UK

D-13 Phase Coexistence and the Structure of the MPB Region in BNT-PT Ceramics

R. Pandey, Banaras Hindu University, Varanasi, India

S.K. Mishra, Bhabha Atomic Research Center, Mumbai, India

A.K. Singh, Banaras Hindu University, Varanasi, India

D-14 Aging of Explosive Crystals Investigated by X-ray Diffraction

M. Herrmann, M.A. Bohn, Fraunhofer ICT, Pfinztal, Germany

D-16 Structural Characterization of New Ternary Yttrium–Rare Earth Sesquioxides Formed by the Sol–Gel Technique

G. Rafailov, I. Dahan, Z. Porat, R. Zach, Nuclear Research Center, Negev, Beer-Sheva, Israel

G. Kimmel, D. Moglyanski, J. Zabicky, Ben-Gurion University of the Negev, Beer-Sheva, Israel

D-19 Profiling Spatial Distribution of Drug Crystallization in Tablets by 2D-XRD

N.K. Thakral, R. Suryanarayanan, University of Minnesota, Minneapolis, MN
H. Yamada, Mitsubishi Tanabe Pharma Co., Osaka, Japan

D-26 Effect of Compression on the Crystallization of Amorphous Indomethacin in Tablets

N.K. Thakral, G.A. Stephenson, Eli Lilly and Company, Indianapolis, IN
S. Mohapatra, R. Suryanarayanan, University of Minnesota, Minneapolis, MN

D-24 Internal Residual Stresses in Friction Stir Welded Aluminum Alloy Sheets

Z.Y. Dou, P.C. Zhang, M.Y. Wang, P. Dong, Science and Technology on Surface Physics and Chemistry Laboratory, Mianyang, China

Y. Li, L. Chen, China Academy of Engineering Physics, Mianyang, China

L. Zheng, No.59 Institute of China Ordnance Industry, Chongqing, China

D-28 Spherical Optics Stress Analysis

J. Maj*, G. Navrotski, L. Assoufid, Argonne National Laboratory, Argonne, IL

D-30 Crystalline Phase Analysis of Sintered Ore by X-ray Diffraction / Rietveld Refinement

D. Fujimura, T. Ashahi, Y. Koike, T. Nakamura, Meiji University, Kawasaki, Japan

A. Ohbuchi, T. Konya, Rigaku Corporation, Tokyo, Japan

D-32 X-ray Diffraction Investigation of Monazite Formation at the Mt Weld Complex Western Australia

T.D. Murphy, S. Hager, A. Roper, J.K. Reynolds, R. Wuhrer, University of Western Sydney, Parramatta, NSW, Australia

D-34 Application of X-ray Diffraction to Hydrothermal Alteration Mineral Characterization Using Laboratory-based XRD and Portable XRD/XRF

S.M.P. Frias*, C.A. Arcilla, University of the Philippines, Quezon City, Philippines

D-42 Influence of Sampling Volume and Stress on the Analysis of Blanket Cu Films

M. Treger*, I.C. Noyan, Columbia University, New York, NY

C. Witt, Global Foundries, Malta, NY

C. Cabral, C. Murray, IBM Research, Yorktown Heights, NY

R. Rosenberg, SUNY Albany, Albany, NY

D-44 Statistical Calibration of ASTM C150 Phase Limits to Directly Determined Phases by Quantitative X-ray Powder Diffraction

P. Stutzman, NIST, Gaithersburg, MD

D-45 X-ray Diffraction Study on FeS₂ Pyrite Single Crystals

N. Farhi, M. Law, M. Limpinsel, Q. Lin, University of California, Irvine, Irvine, CA

N. Kujala, X. Huang, A. Macrander, APS, Argonne National Laboratory, Argonne, IL

D-48 Enhanced Resolution in Plane Grazing Incidence Diffraction

J. Giencke, Bruker AXS, Madison, WI

D-53 Quantitative Analysis of Mineral Phases in Iron Ore Sinter by X-ray Diffraction with Rietveld Analysis

T. Takayama, Nippon Steel and Sumitomo Metal Corporation, Chiba, Japan

M. Kimura, High Energy Accelerator Research Organization, Ibaraki, Japan

D-54 Studying Ferroelectricity at the Nanoscale Using High Energy X-rays

T.C. Monson, Sandia National Laboratories, Albuquerque, NM

S.H. Bang, N. Bean, J.C. de Sugny, R. Gambia, R. Haskell, A. Hightower, Harvey Mudd College, Claremont, CA

E. Puma, Pomona College, Claremont, CA

C. Shi, S. Billinge, Columbia University, New York, NY

Q. Ma, DND-CAT, Advanced Photon Source

D-65 X-ray Diffraction of Nuclear Forensic Samples

S.K. Roberts, Lawrence Livermore National Laboratory, Livermore, CA

D-66 Size and Strain Analysis of Mechanically Alloyed Pt-ZrO₂

T.K. Jung, D.W. Joh, Korea Institute of Industrial Technology, Incheon, Republic of Korea

J. Ling, S.Y. Lee, Columbia University, New York, NY

D-69 Modelling the Diffraction Pattern of Faulted Structures

R. Koch, M. Leoni, University of Trento, Trento, Italy

D-78 X-ray Diffraction Study of Air-sensitive Materials on a Laboratory Equipment

O. Narygina*, **H. van Weeren**, PANalytical B.V., Almelo, The Netherlands

C. Resch, Anton Paar GmbH., Graz, Austria

D-79 Characterization of Nafion Proton Exchange Membrane Films Using Wide Angle X-ray Diffraction

T.N. Blanton, International Centre for Diffraction Data, Newtown Square, PA

R. Koestner, General Motors Corporation, Pontiac, MI

D-82 High-Temperature Study of Zinc-Doped Hydroxyapatite

U. Kivarkis, G. Gonzalez, DePaul University, Chicago, IL

D-83 The Atomic Structure of Partially Amorphous Oxide Semiconductors

G. González-Avilés, J. Boesso, DePaul University, Chicago, IL

D-84 Estimating Photon Counts in a Nanodiffraction Experiment with Gold Nanoparticles

H. Öztürk, I.C. Noyan, Columbia University, New York, NY

H. Yan, Brookhaven National Laboratory, Upton, NY

D-85 Introduction to the World's Finest Modulated Structure Database

D.E. Sagnella, O. Gourdon, D. Gout, S. Kabekkodu, International Centre for Diffraction Data, Newtown Square, PA

D-86 Crystal Structures of Large-Volume Commercial Pharmaceuticals

J.A. Kaduk, Illinois Institute of Technology, Chicago, IL

C.E. Crowder, K. Zhong, T.G. Fawcett, ICDD, Newtown Square, PA

A.A. Sarjeant, Northwestern University, Evanston, IL

M.R. Suchomel, APS, Argonne National Laboratory, Argonne IL

D-87 Sub-micronic Phase, Strain and Texture in Depth Gradient Measurement in Polycrystalline Thin Film: A Nano-pencil Beam Diffraction Approach

N. Vaxelaire, P. Gergaud, CEA, LETI, Grenoble, France

G.B.M. Vaughan, European Synchrotron Radiation Facility, Grenoble, France

D-89 Enhancing Sensitivity of Site Occupancy Analysis in Rietveld Method

A. Takase, Rigaku Americas Corporation, The Woodlands, TX

D. Chen, Z. Celinski, University of Colorado Colorado Springs, Colorado Springs, CO

S-1 Accurate Measurement of Surface Orientation of a Single Crystal Wafer Using High-Resolution XRD

C.S. Kim*, **H.G. Jeon, I.Y. Jung**, Korea Research Institute of Standards and Science (KRISS), Daejeon, South Korea

Y.S. Chung, Chungnam National University, Daejeon, South Korea

S-10 X-ray Diffraction Analysis of the Cause of Casting Powder Deactivation

V. Novosel-Radović, N. Radovic, J. Krajcer, University of Zagreb, Zagreb, Croatia

S-16 Measuring the Absolute Flux of an X-ray Beam in the Range from 500 to 9000 eV

M. Haugh, E. Romano, P. Ross, K. Marlett, M. Odyniec, National Security Technologies

XRF Poster Session – Tuesday Evening, 29 July - **Signifies Presenting Author, when noted*

The Tuesday evening XRF Poster Session will be held 5:00 – 7:00 pm in the Huntley Dining Room, in conjunction with a Wine & Cheese Reception.

Judges: L.L. Brehm, Dow Chemical Company, Midland, MI
M. Schmeling, Loyola University Chicago, Chicago, IL

Three “Best Poster” awards will be given at the end of the session, including “Best Student Poster”

F-8 Stand Back! What is a Safe Distance for Handheld XRF Measurements?

M. Rouillon*, **L. Kristensen**, **D.B. Gore**, Macquarie University, Sydney, Australia

F-12 Mechanical Stress X-ray Emission from Sugar Candy

J. Kawai, **S. Matsuoka**, **K. Yokoi**, **S. Imashuku**, Kyoto University, Kyoto, Japan

F-19 Microsampling Techniques for MXRF Analysis

K.G. McIntosh*, **V.M. Lopez**, **G.J. Havrilla**, Los Alamos National Laboratory, Los Alamos, NM

F-20 Elemental Characterization of Airborne Particulate Matter Collected within the Canadian National Air Pollution Surveillance (NAPS) Program

V. Celo*, **E. Dabek-Zlotorzynska**, **D. Mathieu**, Environnement Canada, Ottawa, Canada

F-24 The Application of Hand-held Rare Earth Rapid Identification Instrument in the Quantitative of Rare Earth Elements in Bastnasite accompanied with Barite

Q. Huayang, **Y. Liangjing**, Central Iron and Steel Research Institute, Beijing, China
L. Xueliang, **M. Dongze**, NCS Testing Technology CO., LTD., Beijing, China

F-25 Fast Determination of Cadmium in Brown Rice by Mini Table-model X-ray

C. Dawei, **Y. Lei**, **S. Jianjun**, **Y. Liangjing**, NCS Testing Technology CO., LTD. Beijing, China

F-28 Readout Electronics for CUBE-based SDDs

R. Stötter, **R. Fojt**, **J. Knobloch**, **E. Lechner**, **C. Luckey**, **A. Pahlke**, **S. Pahlke**, **A. Simsek**, **C. Zacher**, KETEK GmbH, Munich, Germany

F-30 Characterization of Thicker Vortex Silicon Drift Detectors

L. Feng*, **S. Barkan**, **V.D. Saveliev**, **M. Takahashi**, **Y. Wang**, **E.V. Damron**, Hitachi High-Technologies Science America, Inc., Northridge, CA

F-34 Development and Deployment of a Miniature X-ray Fluorescence Spectrometer for Radiological Glovebox Applications

D.M. Missimer, P.E. O'Rourke, R.L. Rutherford, Savannah River National Laboratory, Aiken, SC

F-43 Non-Scanning Type X-ray Fluorescence and X-ray Diffraction Imaging and the Applications

K. Sakurai, M. Mizusawa, National Institute for Materials Science, Ibaraki, Japan

F-45 X-ray Fluorescence Analysis of Mexican Varieties of Dried Chili Peppers

E. Romero-Dávila, Eton School, México, D.F., Mexico

J. Miranda, J.C. Pineda, Universidad Nacional Autónoma de México, México

F-57 Hybrid Sn₃O₂(OH)₂/Graphene Nanoparticles as Anode for Lithium Ion Batteries

C.J. Pelliccione, J.P. Katsoudas, C.U. Segre, Illinois Institute of Technology, Chicago, IL

E.V. Timofeeva, T. Chrobak, Energy Systems Division, Argonne National Lab, Argonne, IL

F-61 Distribution of Sr and Pb in Bone of a Parenteral Nutrition Patient using Synchrotron XRF

A.L. Galusha*, University of Albany, Albany, NY

D. Guimarães Guedes, New York State Department of Health, Albany, NY

P.J. Parsons, University of Albany, Albany, NY and New York State Department of Health, Albany, NY

F-64 EDXRF Studies on Chinese Ancient Ceramics: A Comparison of Bench-top XRF, HH-XRF and Micro XRF

Y. Gong, Y. Xiong, Shanghai Museum, Shanghai, China

J. Gu, Bruker Elemental, WA

F-67 Possibilities of Total Reflection X-ray Spectrometry (TXRF) for Elemental Analysis of Pharmaceutical Products and Vitamins

I. Queralt*, Institute of Earth Sciences, Barcelona, Spain

E. Marguí, M. Hidalgo, University of Girona, Girona, Spain

F-69 Current Trends in Trace and Ultratrace Analysis of Liquid Samples by X-ray Fluorescence Spectrometry

I. Queralt*, Institute of Earth Sciences, Barcelona, Spain

E. Marguí, M. Hidalgo, University of Girona, Girona, Spain

B. Zawisza, R. Sitko, University of Silesia, Katowice, Poland

F-70 Non-destructive Micro-EDXRF Analysis for the Fast Characterization of Authentic and Counterfeit Euro Banknotes

I. Queralt*, H. Gallardo, Institute of Earth Sciences, Barcelona, Spain

E. Marguí, University of Girona, Girona, Spain

F-74 TXRF Measurements of S and P in Proteins using a Special TXRF Vacuum Chamber for Low Z Elements

M. Rauwolf, P. Wobrauschek, C. Streli, Vienna University of Technology, Vienna, Austria

C. Vanhoof, K. Tirez, VITO, Mol, Belgium

F-75 Low Z TXRF Measurements with a New KETEK SDD detector

M. Rauwolf, D. Ingerle, P. Wobrauschek, C. Strelt, Vienna University of Technology,
Vienna, Austria

A. Pahlke, KETEK, Munich, Germany

F-78 Development of Silicon Standards on Polytetrafluoroethylene (PTFE) Membrane Filters for
Calibration of XRF Instruments

K. Trzepla, S. Yatkin, H. Amin, A.M. Dillner, N. Hyslop, UCD, Davis, CA

F-79 Evaluating EDXRF Measurements of Atmospheric Aerosols with Multi-Elemental
Standards

S. Yatkin, K. Trzepla, W. White, N. Hyslop, UCD, Davis, CA

F-89 Characterizing Quantitative Trace Analysis for Soil using Standard-less Fundamental
Parameters Based PEDXRF Spectrometry

W.A. Abuhani, N. Dasgupta-Schubert*, L.M. Villaseñor Cendejas, University of Michoacan,
Morelia, Mexico

Plenary Session - Wednesday am – 30 July, 8:30 am – 11:45 pm- **Signifies Presenting Author*

Plenary Session: X-rays on Mars

Chairs: **W. Tim Elam**, University of Washington, APL, Seattle, WA

Tom N. Blanton, International Centre for Diffraction Data, Newtown Square, PA

8:30 Opening Remarks

Chairman of the Denver X-ray Conference, **W. Tim Elam**, University of Washington
APL, Seattle, WA

Presentation of Awards:

2014 Birks award. Recipient to be announced.

2014 Jerome B. Cohen Student Award

The winner will be announced at the session. Presented by Cev Noyan, Columbia
University, New York, NY

Plenary Session Remarks by the Chair

Invited Talks:

9:00 D-3 The First X-ray Diffraction Results From Mars

D.L. Bish* and the CheMin Team, Indiana University, Bloomington, IN

9:45 Break

10:15 F-1 XRF Combines with PIXE in Curiosity's Alpha Particle X-ray Spectrometer

J.L. Campbell*, **G.M. Perrett**, University of Guelph, Ontario, Canada

11:00 S-15 Exploring Mars with ChemCam on the Curiosity Rover

S.M. Clegg* and the ChemCam Team, Los Alamos National Laboratory, Los Alamos, NM

Oral Sessions – Wednesday pm, July 30 - **Signifies Presenting Author, when noted*

New Developments in XRD & XRF Instrumentation

Chairs: **T. Fawcett, T.N. Blanton**, International Centre for Diffraction Data, Newtown Square, PA, fawcett@icdd.com; tblanton@icdd.com

12:30 Opening Remarks from the Chairs

12:35 D-35 Improvement of Laboratory SAXS Setups by Incoatec's Scatterless SCATEX Pinholes

A. Beerlink*, **A. Kleine**, **C. Umland**, **J. Graf**, **C. Michaelsen**, **J. Wiesmann**, Incoatec GmbH, Geesthacht, Germany

C. Gollwitzer, Physikalisch Technische Bundesanstalt, Berlin, Germany

C. Krywka, Helmholtz-Zentrum Geesthacht, Geesthacht, Germany

J. Kreith, Materials Center Leoben, Leoben, Austria

12:50 D-77 Humidity Experiments on a Laboratory Diffractometer with a Fully Automatic Coupled Temperature-Humidity Control

O. Narygina*, **H. van Weeren**, PANalytical B.V., Almelo, The Netherlands

C. Resch, Anton Paar GmbH., Graz, Austria

1:05 D-40 New Neutron Diffraction Data Capability in the ICDD PDF-4+ 2014 Relational Database

J. Faber, Faber Consulting, Thornton, PA

C. Crowder, **J. Blanton**, **S. Kabekkodu**, **T. Blanton**, **T. Fawcett**, ICDD, Newtown Square, PA

O. Gourdon, Los Alamos National Laboratory, Los Alamos, NM

1:20 D-49 Innovative 2D Operational Mode for LYNXEYE XE 1D Detector

B. Jones, **J. Giencke**, **B. He**, Bruker AXS Inc., Madison, WI

A. Kern, **G. Vanhoyland**, Bruker AXS GmbH, Karlsruhe, Germany

1:35 D-33 Introducing the Nova SxD Multistrip Diffraction Detector

P. Storer, FCT ACTech Pty Ltd, Adelaide, SA, Australia

1:50 F-27 High-Performance Silicon Drift Detectors

A. Pahlke, **M. Bachmann**, **T. Eggert**, **R. Fojt**, **M. Fraczek**, **L. Höllt**, **M. Hofmann**, **P. Iskra**, **J. Knobloch**, **N. Miyakawa**, **S. Pahlke**, **J. Rumpff**, **O. Scheid**, **A. Simsek**, **R. Stötter**, **I.**

Wennemuth, **F. Wiest**, KETEK GmbH, Munich, Germany

2:05 S-26 Exploiting MYTHEN Detector for High Accuracy Structure Analysis

D. Sisak Jung*, Laboratory of Crystallography, ETH Zurich and DECTRIS Ltd.

Ch. Hoermann, DECTRIS Ltd.

2:20 S-4 High Rate Silicon Drift Detectors for EDXRF and EDS

R.H. Redus*, **A.C. Huber**, Amptek Inc., Bedford, MA

2:35 D-88 Development of a Novel X-ray Detector for In-House XRD

Y. Nakaye, **K. Matsushita**, **T. Sakumura**, **Y. Tsuji**, **T. Taguchi**, Rigaku Corporation, Akishima-shi, Tokyo, Japan

P. Grybos, **R. Szczygiel**, **P. Maj**, AGH University of Science and Technology, Kraków, Poland

2:50 Break

3:15 F-51 Flux Comparisons of Miniature X-ray Tubes: Flux VS Tube Power VS Geometry

S. Cornaby, **K. Kozaczek**, Moxtek Inc, Orem, UT

3:30 S-13 Upgrading Home-Lab X-ray Diffractometers with Incoatec's Unique Microfocus Source

A. Beerlink*, **J. Graf**, **J. Wiesmann**, **C. Michaelsen**, Incoatec GmbH, Geesthacht, Germany

3:45 S-3 Precision Johansson Crystals

B. Verman, **L. Jiang**, **R. Samokyszyn**, **D. Wilcox**, **Li Wang**, Rigaku Innovative Technologies, Inc. (RIT), Auburn Hills, MI

4:00 S-23 Fully Automated Fusion and TGA for XRF and LOI Analysis

R. Wilson, IMP Automation Canada Ltd, Ontario, Canada

4:15 S-14 The Claisse "LeNeo" – A New Automatic Electric Fusion Instrument

C. Audet, Claisse, Corporation Scientifique, Québec, Canada

4:30 F-66 Large Scale Elemental Mapping with High Spatial Resolution

M. Haschke*, **U. Waldschläger**, **R. Tagle**, **F. Reinhardt**, Bruker Nano GmbH, Berlin, Germany

K.H. Janssens, University of Antwerp, Antwerp, Belgium

J. Dik, University of Delft, Delft, Netherlands

4:45 F-22 Online Grade Control in Mining by EDXRF – New Approach to Fulfill Old Dreams of Real Time Results

A. Buman*, Bruker-AXS, Madison WI

A. Buhler, **K. Behrens**, Bruker-AXS, Karlsruhe, Germany

Texture Measurement with X-rays & Electrons

Chair: **B. Wheaton**, Corning, Inc., Corning, NY, wheatonbr@corning.com

1:30 S-21 *Invited* - Texture Measurements using the Neutron Time-of-flight Diffractometer HIPPO

S.C. Vogel, **H.M. Reiche**, Los Alamos Neutron Science Center, Los Alamos, NM

T. Tomida, Nippon Steel & Sumitomo Metal Corporation, Hyogo, Japan

2:00 D-36 *Invited* - In-situ Synchrotron Texture and Strain Analysis at High Pressures and Temperatures

L. Miyagi, University of Utah, Salt Lake City, UT

2:30 D-15 Automated Generation of Efficient Scanning Schemes for XRD Pole Figure Measurements with Area Detectors

F. Bachmann, H. Schaeben, Institut für Geophysik und Geoinformatik, TU Bergakademie Freiberg, Germany

K. Molodov, M. Witte, G. Gottstein, Institut für Metallkunde und Metallphysik, RWTH Aachen, Germany

2:50 Break

3:20 D-27 High Resolution Texture Measurements with X-ray Area Detectors and ODF Estimation

F. Bachmann, H. Schaeben*, Institut für Geophysik und Geoinformatik, TU Bergakademie Freiberg, Germany

K. Molodov, M. Witte, Institut für Metallkunde und Metallphysik, RWTH Aachen, Germany

3:40 S-2 Quantitative Texture Analysis Via Tilt-A-Whirl and MAUD Software Packages

M.A. Rodriguez*, **J. Carroll**, **J.J.M. Griego**, Sandia National Laboratories, Albuquerque, NM

4:00 D-8 *Invited* - The Characterization of Texture and Microstructure by Electron Backscatter Diffraction

S.I. Wright, EDAX, Draper, UT

4:30 D-38 Crystal Orientation Measurements using SEM-EBSD Under Unconventional Conditions

K. Kunze, ETH Zurich, ScopeM, Switzerland

General XRF

Chair: **D. Burns**, Dow Chemical Company, Freeport, TX, dwburns1@dow.com

12:30 F-13 *Invited* - Preparation and Evaluation of Additive Standards for X-ray Fluorescence Analysis of Polyolefins

D. Burns, M. Wright, S. Green, Dow Chemical, Freeport, TX

S. Yusuf, Dow Chemical, Midland, MI

J. Faucheux, Dow Chemical, Taft, LA

1:00 F-56 EDS, SEM, and 3-D Analysis of Ancient Stone Tools

K. Bennallack*, **T.E. Levy**, **F. Kuester**, University of California, San Diego, La Jolla, CA

1:20 F-63 X-ray Fluorescence for Analysis of Fluorine in Aluminosilicate Material

L.L.Brehm*, The Dow Chemical Company, Midland, MI

R.H. Hinz, The Dow Chemical Company, Schkopau, Germany

1:40 F-18 Characterization of Soil Particles using Complementary XRF Analytical Methods

K.G. McIntosh*, **G.J. Havrilla**, Los Alamos National Laboratory, Los Alamos, NM

2:00 F-52 Microphonic Effects in Pin-Diode X-ray Detectors

A. Stratilatov, **S. Chin**, **C. Carter**, **K. Kozaczek**, **S. Cornaby**, Moxtek Inc., Orem, UT

2:20 F-50 Determination of Magnesium Concentration in Commercial Magnesium Stearate Samples using XRF Spectroscopy

S. Mamedov, **H. Savadkouei**, Horiba Scientific, Edison, NJ

2:40 Break

3:10 F-87 *Invited* - Analysis of Plastic Materials and Coatings by X-ray Fluorescence

P. Ricou, Arkema Inc., King of Prussia, PA

3:40 F-39 Sample Preparation Using Internal Standards - Improving Precision with Simplicity

D. Verbeeten*, XRF Scientific, Osborne Park, Western Australia

S. Ulitzka, TWOTHETA Pty Ltd, Manly Vale, NSW, Australia

4:00 F-44 Road to Micron Resolution with the Full-field Energy Dispersive X-ray Camera "SLcam"

S.H. Nowak, **O. Scharf**, **A. Bjeoumikhov**, IFG Institute for Scientific Instruments GmbH, Berlin, Germany

J. Buchriegler, Helmholtz-Zentrum Dresden-Rossendorf e.V., Dresden, Germany

H. Soltau, PNDetector GmbH, Munich, Germany

L. Strüder, PNSensor GmbH, Munich, Germany

R. Wedell, IAP Institute for applied Photonics e.V., Berlin, Germany

4:20 F-81 XAFS of Lead-Free Piezoelectric Ceramics BZT-BCT

Y. Ding*, **C. Segre**, Illinois Institute of Technology, Chicago, IL

Micro XRF

Chair: **G.J. Havrilla**, Los Alamos National Laboratory, Los Alamos, NM, havrilla@lanl.gov

1:00 F-65 *Invited* - State-of-the-art Quantification Methodology for 3D Micro-XRF

I. Mantouvalou, **T. Wolff**, **L. Luehl**, **W. Malzer**, **B. Kanngiesser**, Technical University of Berlin, Berlin, Germany

1:30 F-85 *Invited* - Synchrotron Radiation Based Confocal X-ray Fluorescence and Absorption Microspectroscopy in Earth and Environmental Science

L. Vincze, Ghent University, Ghent, Belgium

2:00 F-10 *Invited* - Full Field X-ray Fluorescence with an X-ray pinhole Camera Presenting High Energy and High Spatial resolution

F.P. Romano*, **L. Pappalardo**, IBAM-CNR & LNS-INFN, Catania, Italy

L. Cosentino, **G. Deluca**, **S. Gammino**, **D. Mascali**, INFN-LNS, Catania, Italy

F. Rizzo, University of Catania, Catania, Italy

2:30 F-17 Performance Characteristics of hiRX - New XRF Instrument for Sensitive and Selective Analyses

G.J. Havrilla*, **K. McIntosh**, **V. Lopez**, Los Alamos National Laboratory, Los Alamos, NM

2:50 F-3 Multidimensional Analytical Data – Presentation, Evaluation and Extraction

M. Haschke, Bruker Nano GmbH

U. Waldschläger, **R. Tagle**, **F. Reinhardt**, Bruker Nano GmbH

3:10 Break

3:40 S-20 Towards 2D/3D MICRO-XAS at the Dubble Beamline of the ESRF

P. Tack, **J. Garrevoet**, **S. Bauters**, **B. Vekemans***, **L. Vincze**, Ghent University, Ghent, Belgium

D. Banerjee, **A. Longo**, **W. Bras**, ESRF, Grenoble, France

4:00 F-36 Determination of Compositional Patterns in Glasses and Sands: Multivariate Approach

S. Mamedov, Horiba Scientific, Edison, NJ

4:20 F-46 State of the Art Micro-XRF Applied to Geological Samples

F. Reinhardt, **R. Tagle**, **R. Erler**, **U. Waldschlaeger**, Bruker Nano GmbH, Berlin, Germany

4:40 F-49 Locating Trace Plutonium in Contaminated Soil Using Micro-XRF Imaging

C.G. Worley, Los Alamos National Laboratory, Los Alamos, NM

Oral Sessions – Thursday am, July 31 - **Signifies Presenting Author, when noted*

Rechargeable Battery Characterization

Chair: **M.A. Rodriguez**, Sandia National Laboratory, Albuquerque, NM, marodri@sandia.gov

9:00 D-63 *Invited* - Ex Situ XRD Characterization of Cycled Metal Oxide Electrodes for Lithium-Ion Batteries

N.S. Hudak*, **M.A. Rodriguez**, **L.E. Davis**, **G. Nagasubramanian**, Sandia National Laboratories, Albuquerque, NM

9:30 S-6 Li-Ion Battery Ageing – 3D Imaging of Elemental Deposition of MN, NI and CU on the Graphite Anode in Cycled LNI0.5MN1.5O4 /Graphite Full Cells

U.E.A. Fittschen, **M. Menzel**, University of Hamburg, Hamburg, Germany

U. Bösenberg, DESY, Hamburg, Germany

M. Falk, **B. Jache**, **J. Janek**, University of Giessen, Giessen, Germany

9:50 S-9 X-ray Compton Scattering Imaging for Rechargeable Batteries

M. Itou*, **Y. Sakurai**, Japan Synchrotron Radiation Research Institute, Sayo, Hyogo, Japan

M. Nagamine, **T. Inoue**, **S. Chiba**, **Y. Kayahara**, Nagamine Manufacturing Co., Ltd., Nakatado, Kagawa, Japan

H. Sakurai, **K. Suzuki**, Gunma University, Kiryu, Gunma, Japan

Y. Orikasa, **Y. Uchimoto**, Kyoto University, Kyoto, Kyoto, Japan

K. Sato, **H. Yamashige**, **M. Sakano**, **T. Nakano**, Toyota Motor Corporation, Toyota, Aichi, Japan

10:10 Break

10:40 S-7 *Invited* - Neutron Reflectometry: A Unique Probe for the In Situ Study of Interfacial Reactions on Thin Film Electrical Energy Storage Materials

J.F. Browning*, **G.M. Veith**, **L. Baggetto**, **J.K. Keum**, Oak Ridge National Laboratory, Oak Ridge, TN

W.E. Tenhaeff, University of Rochester, Rochester, NY

11:10 S-19 Using High-Energy X-rays to Probe Batteries in Operando

J. Okasinski*, **P. Kenesei**, **J. Almer**, **J.-L. Shui**, **D.-J. Liu**, **D. Abraham**, Argonne National Laboratory, Argonne, IL

11:30 S-5 Bench-top Beamlines for Batteries and other Energy Science and Industrial Applications: A Modernization of Laboratory-Based XANES and XES

G.T. Seidler, **D. Mortensen**, **J. Pacold**, **O. Hoidn**, University of Washington, Seattle, WA

Nuclear Materials

Chairs: **D. Brown**, **T. Sisneros**, Los Alamos National Laboratory, Los Alamos, NM, dbrown@lanl.gov, tsisneros@lanl.gov

8:30 S-18 *Invited* - X-ray absorption Spectroscopy and Photoelectron Spectroscopy of Nuclear Materials

J. Terry, Illinois Institute of Technology, Chicago IL

9:00 S-17 Y-Ti-O Core–Shell Nanoclusters in Oxygen Dispersion Strengthened Steels

S. Liu, C. Segre, Illinois Institute of Technology, Chicago IL

G.R. Odette, University of California, Santa Barbara, CA

9:20 D-37 Evolutionary Insights into the Structure of Irradiated Reactor Pressure Vessel Steels
D.J. Sprouster, J. Sinsheimer, S. Ghose, E. Dooryhee, L.E. Ecker, Brookhaven National Laboratory, Upton, NY

P. Wells, Y. Wu, G.R. Odette, University of California Santa Barbara, Santa Barbara, CA

9:40 D-51 In-Situ Studies of Dislocation Structure Evolution during Annealing of Neutron Irradiated Zr-2.5Nb Alloy

L. Balogh*, F. Long, M.R. Daymond, Queen's University, Kingston, ON, Canada

D.W. Brown, T.A. Sisneros, B. Clausen, Los Alamos National Laboratory, Los Alamos, NM

P. Mosbrucker, Kinectrics Inc., Toronto, ON, Canada

10:00 Break

10:30 D-73 *Invited* - Synchrotron XRD Investigations on the Responses of the Dispersive Inclusion Phases in Structural Materials to Externally Applied Stress

J. Stubbins, University of Illinois, Urbana, IL

11:00 D-52 High Energy X-ray Diffraction Study of Deformation in Irradiated HT9

C. Tomchik*, K. Mo, J.F. Stubbins, University of Illinois, Champaign-Urbana, IL

D.W. Brown, S.A. Maloy, Los Alamos National Laboratory, Los Alamos, NM

L. Balogh, Queen's University, Ontario, Canada

J. Almer, Argonne National Laboratory, Argonne, IL

11:20 D-56 High Energy Synchrotron X-ray Diffraction Measurements of a Uranium-Zirconium Alloy Irradiated at Low Fluences

M.A. Okuniewski*, B. Miller, Idaho National Laboratory, Idaho Falls, ID

L. Ecker, Brookhaven National Laboratory, Upton, NY

J. McDuffee, G. Bell, R. Ellis, L. Snead, S. Voit, Oak Ridge National Laboratory, Oak Ridge, TN

11:40 D-67 Microstructural Evolution of Monolithic Fuel Foils During Processing

D.W. Brown, Los Alamos National Lab, Los Alamos, NM

M.A. Okuniewski, Idaho National Laboratory, Idaho Falls, ID

L. Balogh, Queens University, Kingston, ON, Canada

B. Clausen, T.A. Sisneros, Los Alamos National Lab, Los Alamos, NM

12:00 D-71 *Invited* - High-energy X-ray Studies of Nuclear-Relevant Materials

J. Almer, A. Mashayekhi, M. Li, Argonne National Laboratory, Argonne, IL
L. Wang, Institute for Materials Research, Helmholtz-Zentrum Geeshacht, Germany

Rietveld Analysis

Chair: **J. Kaduk**, Poly Crystallography Inc., Naperville IL, kaduk@polycrystallography.com

8:30 D-64 *Invited* - Powder Diffraction and Real Space Imaging – Tackling Structurally and Compositionally Complex Materials

T. Vogt, University of South Carolina, Columbia, SC

9:00 D-23 Crystal Structure and Electrical Studies of Layered Aurivillius Oxides

J. Shi, S.T. Misture, Alfred University, Alfred, NY

9:20 D-55 Chemical Doping in Sillen-Aurivillius phases: Perovskites in Low Dimensional Multi-layer Structure Types

S. Liu, W. Miiller, P.E.R. Blancharda, B.J. Kennedy, C.D. Ling, The University of Sydney New South Wales, Australia

Y. Liu, Australian National University, ACT, Australia

M. Avdeev, The Bragg Institute, ANSTO, Menai, Australia

9:40 D-17 Time-slicing Non-ambient POWGEN Data - Teasing out Detail After-the-fact

P.S Whitfield*, A. Huq, P. Peterson, SNS, ORNL, Oak Ridge, TN

10:00 Break

10:30 D-70 *Invited* - Nanodomains and Anisotropy in Cubic Garnets

S.M. Antao, University of Calgary, Calgary, Alberta, Canada

11:00 D-12 Crystal Structures of Hydronium Jarosite and Ammoniojarosite: Location of Hydrogen Atoms and Orientational Disorder from Powder Diffraction

H.J. Spratt*, W. Martens, Queensland University of Technology, Brisbane, Queensland, Australia

M. Avdeev, Bragg Institute, ANSTO, New South Wales, Australia

11:20 D-22 Use of the Rietveld Method for Describing Structure, Phase Composition and Texture in XRD Data of Corrosion Products Formed in Oil and Gas Pipelines: An Important Industrial Challenge

H. Sitepu, S.R. Zaidi, S. Shen, Saudi Aramco, Research and Development Center, Dhahran, Saudi Arabia

11:40 D-43 Proficiency Testing for Powder Diffraction Analyses of Hydraulic Cements

P. Stutzman, NIST, Gaithersburg, MD

12:00 D-2 Bonding in Group 1 Citrate salts

J.A. Kaduk, Illinois Institute of Technology, Chicago IL

A. Rammohan, Atlantic International University, Lisle, IL

Industrial & Hand Held Applications of XRF

Chairs: **J.A. Anzelmo**, Anzelmo & Associates, Inc., Madison, WI, jaanzelmo@aol.com

A. Seyfarth, Bruker Elemental, Kennewick, WA, alexander.seyfarth@bruker-axs.com

8:30 F-31 *Invited* - The Use of XRF in Cultural Heritage: Special Considerations for Special Objects

K. Trentelman, Getty Conservation Institute, Los Angeles, CA

9:00 F-26 *Invited* - Non-destructive EDXRF Studies on Chinese Ancient Ceramics: A Comparison of Bench-top XRF, HH-XRF, and Micro-XRF

Y. Gong*, **Y. Xiong**, Shanghai Museum, Shanghai, China

J. Gu, Bruker Elemental, Kennewick, WA

9:30 F-21 Educating Handheld XRF Users in Cultural Heritage: XRF Bootcamp for Conservators

L.F. Lee, **K. Trentelman**, Getty Conservation Institute, Los Angeles, CA

A. Bezúr, Yale University Center for Conservation and Preservation

9:50 F-54 Laboratory Validation of Portable XRF Instruments to Evaluate Personal Exposure Metals

D. Guimarães, **M.L. Praamsma**, **P.J. Parsons**, Laboratory of Inorganic and Nuclear Chemistry, Wadsworth Center, NYSDOH, Albany, NY

10:10 Break

10:40 F-55 Potential Metal Exposure in the Chinese Community of New York State: In Situ Measurements by XRF

D. Guimarães, **M.L. Praamsma**, **J. Orsini**, **P.J. Parsons**, Laboratory of Inorganic and Nuclear Chemistry, Wadsworth Center, NYSDOH, Albany, NY

D. Gao, **M. Herdt-Losavio**, **S. Lin**, Center for Environmental Health, NYSDOH, Albany, NY

11:00 F-23 Fast Determination of Cadmium in Brown Rice from Grain Supply Center by Mini Table-model X-ray Fluorescence Spectrometer

C. Dawei*, **Y. Lei***, **S. Jianjun***, **Y. Liangjing**, NCS Testing Technology Co., Ltd., Beijing, China

11:20 F-35 Early Warning of Engine Death – Powerful Wear Metal Analysis in Engine Oils and Analysis of Lubricating Oils by Modern WDXRF

L. Arias*, **A. Buman**, Bruker-AXS, Madison, WI

A. Buhler, K. Behrens, Bruker-AXS, Karlsruhe, Germany

11:40 F-40 Analysis of EAF & LMF Slag by XRF

D. Pecard*, **A. Buman**, Bruker AXS, Madison, WI

Oral Sessions – Thursday pm, July 31 - *Signifies Presenting Author, when noted

Line Profile Analysis

Chairs: **T. Ungár**, Eotvos University, Budapest, Hungary, ungar@ludens.elte.hu

I. Cernatescu, Pratt and Whitney, East Hartford, CT, Iuliana.Cernatescu@pw.utc.com

1:30 D-81 *Invited* - Beyond the 3D Periodicity Limits in Modern Whole Pattern Line Profile Analysis

M. Leoni, R. Koch, University of Trento, Trento, Italy

2:00 D-57 Theoretical Calculation for the Temporal Coherence Broadening and Absorption Broadening of the XRD Line Profile

K. Liu, H. Chen, Shanghai Institute of Technology, Shanghai, China

2:20 D-90 *Invited* - X-ray and Neutron Diffraction Line Profile Analysis for the Purpose of Lattice Defect Characterization

T. Ungár, City University of Hong Kong, Kowloon, Hong Kong

2:50 D-50 *Invited* - Correlating Experimentally Determined Dislocation Densities with Crystalline Plasticity Model Predictions: Comparison with 3D Discrete Dislocation Methods

L. Balogh*, **M.R. Daymond**, Queen's University, Kingston, ON, Canada

L. Capolungo, M.V. Upadhyay, Georgia Institute of Technology Lorraine, Metz, France

B. Clausen, C.N. Tome, Los Alamos National Laboratory, Los Alamos, NM

Applied Materials Analysis

Chairs: **T. Fawcett, T.N. Blanton**, International Centre for Diffraction Data, Newtown Square PA, fawcett@icdd.com; tblanton@icdd.com

1:55 Chair Opening Remarks

2:00 D-59 *Invited* - Using Powder X-ray Diffraction to Understand the Dehydration Behavior of a Pharmaceutical Hydrate

S. Yin, A. Patel, Bristol-Myers Squibb Co, New Brunswick, NJ

2:30 D-72 Microstructure Evolution of Beryllium Subjected to Shear Compression Investigated Using Synchrotron X-ray Diffraction

T.A. Sisneros*, **D.W. Brown, B. Clausen, C.M. Cady, G.T. Gray III, W.R. Blumenthal**, Los Alamos National Laboratory, Los Alamos, NM

J. Almer, Argonne National Laboratory, Argonne, IL

2:50 D-20 XRD Phase Identification and Residual Stress Analysis of the Turbine Blade Sample Before and After Heat Treatment

S. Shen, A.H. Mustafa, Saudi Aramco, Dhahran, Saudi Arabia

3:10 D-39 XRD Analysis of FCC Refining Materials

J.P. Nicolich, WR Grace, Cambridge, MA

3:30 Break

4:00 D-25 Quantum Dot Multilayers as Probed by High Resolution X-ray Diffraction

N. Vaxelaire, I.C. Noyan, Columbia University, New York, NY

S. Dhomkhar, I.L. Kuskovsky, Queens College of CUNY, Queens, NY

M.C. Tamargo, City College of CUNY, New York, NY

4:20 D-47 Focusing on the Future; the Use of Microfocus Sources for Materials Research Applications

J. Giencke, B. Jones, Bruker AXS, Madison, WI

G. Vanhoyland, Bruker AXS, Karlsruhe, Germany

4:40 D-76 Simulation Tools and References for the Analysis of Nanomaterials

T.G. Fawcett*, **S.N. Kabekkodu, J.R. Blanton, C.E. Crowder, T.N. Blanton**, ICDD, Newtown Square, PA

Fast Element & Species-specific Imaging

Chairs: **K. Janssens**, University of Antwerp, Antwerp, Belgium, koen.janssens@ua.ac.be

G.J. Havrilla, Los Alamos National Laboratory, Los Alamos, NM, havrilla@lanl.gov

1:20 F-62 *Invited* - The Maia Detector: Past, Present and Future

D.P. Siddons, G. De Geronimo, A.J. Kuczewski, Z.Y. Li, D. Pinelli, R. Beuttenmuller, D. Elliott, Brookhaven National Laboratory, Upton, NY

R. Kirkham, G.F. Moorhead, P.A. Dunn, CSIRO Materials Science and Engineering, Clayton, Australia

C.G. Ryan, CSIRO Earth Sciences and Resource Engineering, Kensington, Australia

G.A. Carini, A. Dragone, SLAC National Accelerator Laboratory, Menlo Park, CA

T.A. Tyson, New Jersey Institute of Technology, Newark, NJ

1:50 F-2 Fast Element Mapping – Instrumental Requirements and Influence of Measurement Conditions

M. Haschke*, **U. Waldschläger, R. Tagle, U. Rossek**, Bruker Nano GmbH, Berlin, Germany

2:10 S-8 The Use of Multiple X-ray Imaging Techniques to Better Understand Density and Structure Variations within Aerogels and Polystyrene Foams

N.L. Cordes, J. Cowan, C.E. Hamilton, K.A. Obrey, B.M. Patterson, Los Alamos National Laboratory, Los Alamos, NM

2:30 S-25 *Invited* - 'Hierarchical' Examination of Paintings by V. van Gogh using Several X-ray Based Methods of Investigation

K. Janssens, G. Van der Snickt, F. Vanmeert, University of Antwerp, Antwerp, Belgium

L. Monico, C. Miliani, B. Brunetti, University of Perugia/CNR, Perugia, Italy

M. Alfeld, G. Falkenberg, PETRA-III@DESY, Hamburg, Germany

M. Cotte, ESRF, Grenoble, France

3:00 Break

3:30 F-41 *Invited* - 3D and Beyond - Basics and Applications of the Color X-ray Camera

M. Radtke*, **G. Buzanich, U. Reinholz, H. Riesemeier**, BAM Federal Institute for Materials Research and Testing, Berlin, Germany

O. Scharf, IfG Institute for Scientific Instruments GmbH, Berlin, Germany

4:00 D-74 Macroscopic XRF/XRPD Scanning System for Non-Destructive Examination of Oil Paintings and Other Cultural Heritage Artefacts

F. Vanmeert, S. De Meyer, W. De Nolf, G. Van der Snickt, S. Legrand, K. Janssens, University of Antwerp, Antwerp, Belgium

J. Dik, Delft University of Technology, Delft, The Netherlands

4:20 F-72 Wavelength Dispersive XRF Imaging Spectrometer Using Polycapillary Angular Filter and 2D X-ray Detector

K. Tsuji*, **M. Yamanashi**, Osaka City University, Osaka, Japan

S. Kato, T. Yamada, T. Shoji, Rigaku Corporation, Osaka, Japan

4:40 F-32 In-Situ Ru K-Edge XAS Study of Ru@Pt Nanoparticles as a Model DMFC Electrocatalyst

C.J. Pelliccione, J. Katsoudas, C.U. Segre, Illinois Institute of Technology, Chicago, IL

E.V. Timofeeva, Energy Systems Division, Argonne National Lab, Argonne, IL

Trace Analysis

Chair: **M.A. Zaitz**, IBM, Hopewell Junction, NY, zaitz@us.ibm.com

1:30 F-88 *Invited* - Portable TXRF Analysis with Low Wattage X-ray Tube

J. Kawai, L. Ying, Kyoto University, Kyoto, Japan

2:00 F-76 Comparison of Different Excitation Modes for the Analysis of Light Elements with a TXRF Vacuum Chamber

P. Wobrauschek, J. Prost, C. Strelt, Vienna University of Technology, Vienna, Austria

2:20 F-86 XRS for Indoor Air Quality Assessment in Some Important Museums

R. Van Grieken, University of Antwerp, Antwerp, Belgium

2:40 F-71 TXRF Analysis of Halogen in Japanese Soy Sauce and Other Liquid Samples

K. Tsuji*, **Y. Tabuchi**, Osaka City University, Osaka, Japan
Y. Shimizu, **T. Yamada**, Rigaku Corporation, Osaka, Japan

3:00 Break

3:30 S-27 *Invited* - TXRF Analysis at 450mm

Y. Ding, **J. Formica***, **L. Shen**, Rigaku Americas Corporation, The Woodlands, TX
H. Kohno, **M. Yamagami**, Rigaku Corporation, Takatsuki, Osaka, Japan

4:00 F-73 Characterization of Ultra-shallow Implants Following a New Approach of Simultaneous Evaluation of GIXRF and XRR

C. Strelt, **D. Ingerle**, **M. Schiebel**, **F. Meirer**, Vienna University of Technology, Vienna, Austria

G. Pepponi, Fondazione Bruno Kessler, Trento, Italy

4:20 F-53 Metal Contents in Pipeline-Grade Mined Bitumen from Alberta Oil Sands by TXRF

B. Patarachao*, **A. Zborowski**, **P.H.J. Mercier**, National Research Council Canada, Ottawa, Ontario, Canada

4:40 F-83 Development of Nanogram XRF Standards for Biological Applications

N. Kumar, **M. Garcia**, UHV Technologies, Inc., Fort Worth, TX

Oral Sessions – Friday am, August 1 - **Signifies Presenting Author, when noted*

Stress Analysis

Chair: **T.R. Watkins**, Oak Ridge National Laboratory, Oak Ridge, TN, watkinstr@ornl.gov

8:30 S-24 *Invited* - Pinhole Camera for Neutron Diffraction

A.D. Stoica*, **K. An**, ORNL, Oak Ridge, TN

9:00 D-68 Measuring Residual Stresses in Monolithic Fuel Foils using Neutron Diffraction

B. Clausen, **D.W. Brown**, **T.A. Sisneros**, Los Alamos National Lab, Los Alamos, NM

M.A. Okuniewski, Idaho National Laboratory, Idaho Falls, ID

L. Balogh, Queens University, Kingston ON, Canada

9:20 D-29 Study on Residual Stress and Texture through Thickness of Al Alloys Plate by Short Wave Length Characteristic X-ray Diffract- meter in Nondestructive Way

J. Zhang*, **Z.H. Gao**, **Z.Y. Yang**, **P.F. Ji**, University of Science and Technology Beijing, Beijing, China

L. Zheng, **L.C. Che**, **C.G. He**, **Z.K. Peng**, **Y. Xiao**, Institute of Southwest Engineering Technology, Chongqing, China

P.C. Zhang, China Academy of Engineering Physics, Mianyang, Sichuan, China

9:40 D-7 Extreme Strain: In-Situ X-ray Microdiffraction Measurement During Si Indentation

E.D Specht*, **D. Catoor**, **B.C. Larson**, Oak Ridge National Lab, Oak Ridge, TN

P.S. Phani, University of Tennessee, Knoxville, TN

E.G. Herbert, **G.M. Pharr**, **E.P. George**, Oak Ridge National Lab, Oak Ridge, TN and University of Tennessee, Knoxville, TN

J.Z. Tischler, Argonne National Lab., Lemont, IL

10:00 Break

10:20 D-62 *Invited* - Combined X-ray Diffraction with Biaxial Cruciform Testing at the NIST Center for Automotive Lightweighting

M.A. Iadicola*, **A.A. Creuziger**, **T. Gnaeupel-Herold**, **T. Foecke**, National Institute of Standards and Technology, Gaithersburg, MD

10:50 D-21 Stress Determination through Diffraction: Establishing the Link Between Kröner and Voigt / Reuss Limits

C.E. Murray, IBM T.J. Watson Research Center, Yorktown Heights, NY

11:10 D-61 Load Transfer to a Self-Aligned in-situ Formed Reinforcement in a Polymer Nanocomposite

J.C. Hanan*, **S. Bandla**, **M. Allahkarami**, Oklahoma State University, Tulsa, OK

11:30 D-46 Microdiffraction in a Macroscopic World

J. Giencke, B. Jones, B. He, Bruker AXS, Madison, WI

11:50 D-18 Strain and Stress Determination by the Rietveld Refinement

D. Balzar, University of Denver, Denver, CO

N.C. Popa, National Institute of Materials Physics, Magurele, Romania

S.C. Vogel, Los Alamos National Laboratory, Los Alamos, NM

Small Angle X-ray Scattering for Nanomaterials Characterization

Chair: **P. Høghøj**, Xenocs, Sassenage, France, peter.hoghoj@xenocs.com

Co-chair: **M. Krumrey**, Physikalisch-Technische Bundesanstalt, Berlin, Germany

8:30 D-75 *Invited* - It's a Small World: Applications of Advanced SAXS

B.R. Pauw, National Institute of Materials Science, Tsukuba, Ibaraki, Japan

9:00 D-4 *Invited* - Small Angle X-ray Scattering Studies of Dynamical Transformation of Taxol-stabilized Microtubules into Inverted Tubulin Tubules

Y. Li*, **P.A. Kohl**, **H.P. Miller**, **L. Wilson**, **C.R. Safinya**, University of California at Santa Barbara, Santa Barbara, CA

M.A. Ojeda-Lopez, Universidad Autonoma de San Luis Potosí, San Luis Potosí, México

D.J. Needleman, Harvard University, Cambridge, MA

C. Song, **M.C. Choi**, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea

A. Ginsburg, **U. Raviv**, The Hebrew University of Jerusalem, Jerusalem, Israel

9:30 S-22 Studies of Fat Mesocrystal Networks at High Concentrations: Modelling, Computer Simulation and Ultra Small Angle X-Ray Scattering

F. Peyronel*, **A.G. Marangoni**, University of Guelph, Guelph, ON, Canada

B. Quinn, St. Francis Xavier University, Antigonish, NS, Canada

D.A. Pink, St. Francis Xavier University, Antigonish, NS, Canada and University of Guelph, Guelph, ON, Canada

9:50 Break

10:10 S-11 *Invited* - Traceable Size Determination of Nanoparticles with SAXS

M. Krumrey, PTB, Berlin, Germany

10:40 D-80 Characterizing Nano-Materials with SAXS and WAXS

P. Høghøj*, **F. Bossan**, **S. Desvergne-Blenau**, **M. Fernandez-Martinez**, **B. Lantz**, **R. Mahe**, **P. Panine**, **S. Rodrigues**, Xenocs, Sassenage, France

11:00 D-5 Investigating the Nanostructuring of Polymer Fuel Cell Membranes: A PVDF - Sulfonated Polyelectrolyte Blend Case Study

P. Ricou*, **D. Mountz**, **L. Fang**, **J. Fang**, **W. He**, **J. Goldbach**, Arkema Inc., King of Prussia Research Center, King of Prussia, PA

Quantitative Analysis

Chair: **L.L. Brehm**, Dow Chemical Company, Midland, MI, lbrehm@dow.com

8:30 F-68 *Invited* - XRF in the Automotive Research Lab

A. Drews, Ford Research and Advanced Engineering, Dearborn, MI

9:00 F-14 *Invited* - Gravimetric Preparation of Calibration Standards for XRF Analyses of Polyvinyl Chloride

J.R. Sieber*, **J.L. Molloy**, **C. Bibb**, **M. Boyce**, National Institute of Standards & Technology Gaithersburg, MD

9:30 F-15 On the Effect of Dead Time Correction on the Counting Statistical Error

B.A.R. Vrebos, PANalytical B.V., the Netherlands

9:50 F-11 High Throughput Analysis of Small Quantity of Catalyst by WDXRF

M. Fontaine, **Y. Toe**, **C.-P. Lienemann**, IFP New Energy, Solaize, France

J. Strangeways, FLSmidth A/S, Valby, Denmark

10:10 Break

10:40 F-48 *Invited* - TXRF Analysis of Ocular Tissues and Fluids

M. Schmeling*, Loyola University Chicago, Chicago, IL

B.I. Gaynes, **S. Tidow-Kebritchi**, Loyola University Chicago, Maywood, IL

11:10 F-29 Shading Effects in SR-TXRF: Calculations and Experimental Visualization using Color X-ray Camera

M. Menzel, **U.E.A. Fittschen**, University of Hamburg, Hamburg, Germany

O. Scharf, **S. Nowak**, IFG Institute for Scientific Instruments GmbH, Berlin, Germany

M. Radtke, **U. Reinholz**, **G. Buzanich**, BAM Federal Institute for Materials Research and Testing, Berlin, Germany

V. Montoya, **K. McIntosh**, **G.J. Havrilla**, Los Alamos National Laboratory, Los Alamos, NM

P. Hischenhuber, **C. Strelj**, Institute of Atomic and Subatomic Physics, Vienna, Austria

11:30 F-16 Actinide Characterization using UHEXRF

G.J. Havrilla*, **K. McIntosh**, **V. Lopez**, Los Alamos National Laboratory, Los Alamos, NM

W.T. Elam, University of Washington, Seattle, WA

D. Robinson, Argonne National Laboratory, APS, Argonne, IL

11:50 F-84 A Rapid and Accurate Multi-Matrix Analysis Method for Slag Using WDXRF

A. Martin, Thermo Scientific

Environmental & Geological Applications

Chairs: **J. Miranda**, Universidad Nacional Autonoma de Mexico, Mexico City, Mexico, miranda@fisica.unam.mx

R. Van Grieken, University of Antwerp, Antwerp, Belgium, rene.vangrieken@uantwerpen.be

8:30 F-47 *Invited* - TXRF and GIXRF Analysis of NASA Genesis Mission Samples

M. Schmeling*, **E. Hwang**, Loyola University Chicago, Chicago, IL

9:00 F-77 *Invited* - The Use of XRF Instrumentation in Environmental Impact Assessment Studies

I. Queralt, Institute of Earth Sciences Jaume Almera, CSIC, Barcelona, Spain

9:30 F-5 Mineralogical Effects of Sulfur in Handheld XRF

M. Cameron, **A. Seyfarth**, Bruker Elemental, Kennewick, WA

9:50 F-7 Elemental Determinations from Geological to Biological: WDXRF Analysis with Standard, Standardless, and Advanced Investigative Techniques

A. Martin, Thermo Scientific, West Palm Beach, FL

A. McWilliams, Research Triangle Institute, Durham, NC

10:10 Break

10:40 F-58 *Invited* - Handheld XRF Applications to Mudrock Chemostratigraphy: Methods, Pitfalls, and Examples

H. Rowe, Bureau of Economic Geology, UT Austin, Austin, TX

11:10 F-33 3D Imaging and Elemental Analysis of a Mineralogical Core Combining X-ray Computed Tomography and Confocal Micro X-ray Fluorescence

N.L. Cordes, **G.J. Havrilla**, **B.M. Patterson**, Los Alamos National Laboratory, Los Alamos NM

S. Seshadri, **M. Feser**, Carl Zeiss Microscopy Inc., Pleasanton, CA

X. Yuan, **Y. Gu**, **D. Wang**, University of Queensland, Brisbane, Australia

11:30 F-59 Tracing Legacy Sediment and Contaminants from Historical Gold Mining using XRF, XRD and pOSL

N. Nagle, **T. Ralph**, **D. Gore**, **K. Fryirs**, Macquarie University, Sydney, Australia

11:50 F-80 TXRF System For Mercury Emissions Monitoring Of Coal Powered Plants

N. Kumar, **M. Garcia**, UHV Technologies, Inc., Fort Worth, TX

12:10 F-9 Engaging with Urban Communities: Using Handheld XRFs to Provide Information on Domestic Garden Soils

M. Rouillon*, **D.B. Gore**, **M.P. Taylor**, Macquarie University, Sydney, Australia

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Total Reflection X-ray Fluorescence (TXRF) is a variation of standard Energy Dispersive X-ray Fluorescence (EDXRF), utilizing glancing angle technology. This NEW 3-day workshop is designed to provide more in-depth understanding of TXRF analysis to users who want to improve their analysis skills and expand the range of analyses. Covering basic theory to applications, the workshop will also highlight the advantages of TXRF: multi-element and non-destructive analyses, with simple calibrations.

Practical X-ray Fluorescence: 27 April–1 May 2015

From theory to hands-on exercises, this course offers techniques and skills to improve lab performance. Discover the latest in cutting-edge instruments such as TXRF, hand-held devices, energy dispersive and wavelength dispersive spectrometers through live demonstrations.

The XRF course covers the basics of X-ray spectra; instrumentation design; methods of qualitative and quantitative analysis; specimen preparation and applications for both wavelength and energy dispersive spectrometry. Emphasizing quantitative methods; use of automated X-ray spectrometers; review of mathematical matrix correction procedures and new developments in XRF. Submit your samples for analysis by the XRF experts. Selected results will be the basis for class discussion!

Fundamentals of X-ray Powder Diffraction: 1–5 June 2015

For the novice with some XRD knowledge or for the experienced with an interest in the theory behind XRD, this clinic offers a strong base for increased lab performance.

The clinic covers instrumentation, specimen preparation, data acquisition and qualitative phase analysis. Hands-on use of personal computers for demonstration of the latest software; data mining with the PDF. The powder diffractometer: optical arrangement, factors affecting instrumental profile width, choice and function of divergence slit, calibration and alignment, detectors, X-ray optics.

***Advanced Methods in X-ray Powder Diffraction: 8–12 June 2015**

For the experienced XRD scientist, this session offers enhanced analysis skills through intense problem solving, as well as an introduction to the Rietveld Method. Emphasizing computer-based methods of data collection and interpretation, both for qualitative and quantitative phase analysis.

The advanced clinic covers factors affecting d-spacing of crystals: unit cell, crystal structure, and solid solutions, as well as factors affecting diffraction-line intensities: relative and absolute intensities; structure-sensitive properties (atomic scattering and structure factors), polarization effects, and multiplicity; specimen-sensitive effects (orientation, particle size), measurement-sensitive effects (use of peak heights and peak areas), and choice of scanning conditions.



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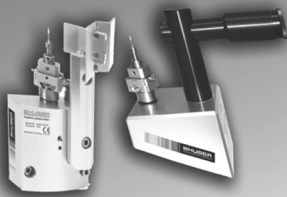
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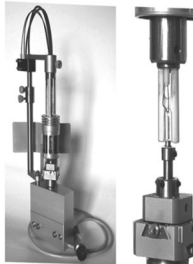
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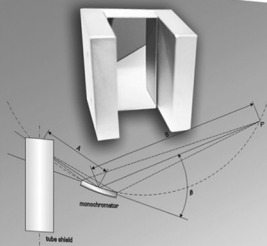


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