

61st Annual Conference on Applications of X-ray Analysis

DENVER X-RAY CONFERENCE

6-10 AUGUST 2012 / DENVER MARRIOTT TECH CENTER HOTEL / DENVER, COLORADO, U.S.A.

PROGRAM

PLENARY SESSION:

*New Frontiers in X-ray Analysis—
Dedicated to the life and work of
Robert L. Snyder*



Training & Applications

Techniques & Instrumentation

Exhibits, Workshops, Sessions

CD of the Proceedings

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2012 DENVER X-RAY CONFERENCE

PROGRAM-AT-A-GLANCE • MONDAY-FRIDAY • 6-10 AUGUST 2012

Monday Morning Workshops 9:00 am – 12:00 Noon				
	Meeting Room			
	Evergreen A	Evergreen B	Evergreen C	Evergreen D
XRD & XRF	3D Imaging (Patterson)			
XRD		Residual Stress (Noyan)	Nanostructures I (Petkov)	
XRF				Basic XRF (Elam/Havrilla)
Monday Afternoon Workshops 1:30 pm – 4:30 pm				
XRD & XRF	X-ray Reflectivity (Sakurai)			
XRD		Two Dimensional Detectors (He/Blanton)	Nanostructures II (Petkov)	
XRF				Energy Dispersive XRF (Phillips)
Monday Evening XRD Poster Session & Reception 5:30 – 7:30 pm Sponsored by PANalytical and ICDD; Evergreen Ballroom				
Tuesday Morning Workshops 9:00 am – 12:00 Noon				
XRD	Rietveld Analysis I (Kaduk/Misture)	Phase Identification (Fawcett/Crowder/Blanton)		
XRF			Quantitative Analysis I (Mantler)	Trace/TXRF Analysis (Streli/Wobruschek)
Tuesday Afternoon Workshops 1:30 pm – 4:30 pm.				
XRD & XRF		Cultural Heritage (Karydas/Donais)		
XRD	Rietveld Analysis II (Kaduk/Misture)			
XRF			Quantitative Analysis II (Mantler)	XRF Sample Preparation (Anzelmo)
Tuesday Evening XRF Poster Session & Reception 5:30 – 7:30 pm Sponsored by Chemplex; Evergreen Ballroom				
Wednesday Morning Plenary Session 8:30 am – 11:45 am. New Frontiers in X-ray Analysis - Dedicated to the life and work of Robert L. Snyder (Misture)				
Wednesday Afternoon Sessions				
XRD & XRF	Cultural Heritage (Karydas/Donais) 1:30-5:30			New Developments in XRD & XRF Instrumentation (Fawcett/Blanton) 12:30-5:30
XRD		Stress Analysis (Brown) 1:30-5:20		
XRF			Fusion & Industrial Applications of XRF (Anzelmo) 2:00-4:50	
Wednesday Evening Vendor Sponsored Reception 5:45 - 7:00 pm; Rocky Mountain Event Center				
Thursday Morning Sessions				
XRD & XRF	Improved Fundamental Parameters (Jach/Elam) 9:00-11:50			
XRD		Rietveld Analysis I (Huang) 9:00-11:20	Industrial Applications and Energy Materials I (Payzant/Watkins/Rodriguez) 9:00-12:10	
XRF				Handheld XRF Applications (Russell) 9:00-12:10
Thursday Afternoon Sessions				
XRD & XRF	X-ray Imaging (Patterson) 2:00-5:10			
XRD		Rietveld Analysis II (Huang) 2:00-4:30	Industrial Applications and Energy Materials II (Payzant/Watkins/Rodriguez) 2:00-5:00	
XRF				Trace Analysis (Zaitz) 2:00-4:50
Thursday Evening- A Taste of Colorado - Stranahan's Colorado Whiskey Distillery, 5:45 - 9:00 pm				
Friday Morning Sessions				
XRD	Line Profile Analysis (Cernatescu/Ungár) 8:30-12:00			
XRF		Quantitative Analysis (Brehm) 8:30-12:10	Micro XRF (Havrilla) 8:30-11:50	

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WORKSHOPS MONDAY & TUESDAY 6–7 AUGUST

AM Workshops 9:00 am– 12:00 pm **PM Workshops** 1:30 pm– 4:30 pm

Monday am **XRD & XRF**

3D Imaging – Sponsored by Xradia | *Evergreen A*

Organizer & Instructors:

B. Patterson, *Los Alamos National Laboratory, Los Alamos, NM, bpatterson@lanl.gov*

M. De Graef, *Carnegie Mellon University, Pittsburgh, PA*

R. Ketcham, *The University of Texas at Austin, Austin, TX*

R.M. Suter, *Carnegie Mellon University, Pittsburgh, PA*

The use of three dimensional X-ray imaging, especially computed tomography (CT), has exploded over the past 10 years. Many researchers use it, but few to no courses exist in the basics of operation. This workshop will focus on the basics of X-ray CT, both laboratory and synchrotron sources, how radiography is collected at the different length scales, reconstructed into 3D data sets, and data sets processed. Building upon X-ray absorption imaging, 3D X-ray diffraction imaging will be explored.

Monday am **XRD**

Residual Stress | *Evergreen B*

Organizer & Instructors:

I.C. Noyan, *Columbia University, New York, NY, icn2@columbia.edu*

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

This workshop will cover the basic theory and experimental technique of stress/strain determination with X-ray and neutron diffraction. In addition, error analysis and techniques to check accuracy, precision and resolution of stress measurement instruments will be discussed.

Nanostructures I | *Evergreen C*

Organizer & Instructor:

V. Petkov, *Central Michigan University, Mt. Pleasant, MI, petkov@phy.cmich.edu*

This full day workshop will start with a brief introduction and continue with hands-on training on the atomic pair distribution function analysis, from XRD data reduction into atomic PDFs to structure determination based on atomic PDFs.

Attendees should install the following free software:

RAD: www.phy.cmich.edu/people/petkov/software.html

ISAACS: www.phy.cmich.edu/people/petkov/software.html

PDFgui: <http://www.diffpy.org/download.shtml>

...and come to the workshop with their laptops. Attendees are also encouraged to bring data sets of their own.

Monday am **XRF**

Basic XRF | *Evergreen D*

Organizers & Instructors:

W.T. Elam, *University of Washington APL, Seattle, WA, wtelam@apl.washington.edu*

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

This workshop provides a basic introduction to the principles of XRF, and is specifically aimed at those new to the field. It will start with a general overview of the technique, followed by more specific details of the basic principles. The emphasis will be on understanding how to use XRF and what its capabilities are. In the second half of the workshop, a few selected applications will be presented. The focus of this segment will be to provide an understanding of how the basic principles affect actual practice.

WORKSHOPS MONDAY & TUESDAY 6–7 AUGUST

Monday pm **XRD & XRF**

X-ray Reflectivity | *Evergreen A*

Organizer & Instructors:

K. Sakurai, National Institute for Materials Science (NIMS) and University of Tsukuba, Tsukuba, Japan, sakurai@yuhgiri.nims.go.jp

W.-L. Wu, NIST, Gaithersburg, MD

R. Matyi, University at Albany - SUNY, Albany, NY

V. Samson, University of Tsukuba, Tsukuba, Japan

K. Ueda, Hitachi Ltd., Saitama, Japan

The workshop topics will include:

- What is X-ray Reflectivity?
- Application to Semiconductor and Magnetic Multilayers
- Application to Nano Technology
- Tips for data analysis

Monday pm **XRD**

Two-Dimensional Detectors | *Evergreen B*

Organizers & Instructors:

T.N. Blanton, Eastman Kodak Company Research Labs, Rochester, NY, thomas.blanton@kodak.com

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

T. Taguchi, Rigaku Corporation, Tokyo, Japan, takey@rigaku.co.jp

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

Two-dimensional diffraction data contain 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, data collection strategy, data evaluation algorithms and software, and instrument configurations. In addition to new hardware developments, various application examples, such as phase ID, texture, stress, crystallinity, combinational screening and thin film analysis will be discussed.

Nanostructures II | *Evergreen C*

Organizer & Instructor:

V. Petkov, Central Michigan University, Mt. Pleasant, MI, petkov@phy.cmich.edu

Continuation of Nanostructures I.

Monday pm **XRF**

Energy Dispersive XRF | *Evergreen D*

Organizer & Instructors:

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

R. Cone, Thermo Fisher Scientific, West Palm Beach, FL

A. McWilliams, Research Triangle Institute, Research Triangle Park, NC

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; standardless 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 workshop will appeal to both the beginner and experienced spectroscopist. The major emphases will be applicability of EDXRF and the optimal protocol for generating and reporting of reliable experimental results.

WORKSHOPS MONDAY & TUESDAY 6–7 AUGUST

Tuesday am **XRD**

Rietveld Analysis I | Evergreen A

Organizers & Instructors:

J.A. Kaduk, Poly Crystallography Inc. and Illinois Institute of Technology, Naperville, IL, kaduk@polycrystallography.com

S.T. Misture, NYS College of Ceramics at Alfred University, Alfred, NY, misture@alfred.edu

T. Degen, PANalytical B.V., Almelo, The Netherlands

The workshop will cover the theory (briefly) and applications of Rietveld analysis. A broad range of applications will be covered, including: crystal structure and unit cell refinement, quantitative analysis, size and microstrain determination, texture analysis, and handling partially amorphous specimens. The instructors will provide not only traditional lectures but also will show live demonstrations of refinements, and will be happy to field questions during the demonstrations.

Phase Identification | Evergreen B

Organizers & Instructors:

T.G. Fawcett, International Centre for Diffraction Data, Newtown Square, PA, fawcett@icdd.com

T.N. Blanton, Eastman Kodak Company Research Labs, Rochester, NY, thomas.blanton@kodak.com

C. Crowder, S.N. Kabekkodu, International Centre for Diffraction Data, Newtown Square, PA

Material identification methods using X-ray analyses have been known for over 75 years since the landmark 1936 publication of Hanawalt and Rinn. The fundamental principles have remained the same where unknown materials are compared to a series of reference materials, commonly referred to as a “fingerprint” technique. While the principles remain the same, there have been evolutionary changes in the algorithms used, the quality of data collected, the number of reference materials, and the accuracy and precision of both the experimental and reference data. In general, the evolution has been accomplished by integrating more information and more types of information in the phase identification process, using more powerful algorithms, and increasing the speed and accuracy of the analysis by using increasingly more powerful computers. Modern methods use total patterns, self analyzing and correcting software and sophisticated information filters and diagnostics. These tools are applied to both the experimental and reference data to obtain the best results. Overall, this results in having routine laboratory capabilities today that far exceed the capabilities of the method founders. In this workshop, we will discuss the evolutionary process, the best application of today’s methods, diagnostic tools, and end with a discussion on new developments feeding the next stages of evolution.

Tuesday am **XRF**

Quantitative Analysis I | Evergreen C

Organizer & Instructors:

M. Mantler, Rigaku Corporation, Purkersdorf, Austria, michael.mantler@rigaku.com

B. Vrebos, PANalytical, Almelo, The Netherlands

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

Basic Methods of Quantitative Analysis:

1. Theoretical and mathematical foundation: Classical fundamental parameter models.
2. Practical application: Working curves and influence coefficients, compensation methods.

Trace/TXRF Analysis | Evergreen D

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

A. Martin, Thermo Fisher Scientific, Sugarland, TX

This year’s trace analysis workshop will provide an introduction of basic fundamentals in XRF, interesting for both beginners and experienced X-ray spectroscopists. Main topics to be covered are presentations of most modern techniques and instrumentation for trace element analysis. Physical methods to improve minimum detection limits in XRF by background reduction will be discussed; Special emphasis will be on Synchrotron radiation as an excitation source. Introduction to total reflection XRF (TXRF) and actual instrumentation is another point of interest and will show achievable advantages and results in terms of detection limits, sensitivities and detectable elemental range down to light elements (e.g., Carbon). Confocal μ -XRF will be presented as method for 2D and 3D spatially resolved elemental imaging. Applications from interesting scientific fields as environment, microelectronics, forensic, and life science will show the successful use and importance of the various XRF spectrometric techniques.

WORKSHOPS MONDAY & TUESDAY 6–7 AUGUST

Tuesday pm **XRD & XRF**

Cultural Heritage | Evergreen B

Organizers & Instructors:

A. Karydas, International Atomic Energy Agency, Vienna, Austria, a.karydas@iaea.org

M.K. Donais, Saint Anselm College, Manchester, NH, mtonais@anselm.edu

A. Heginbotham, J. Paul Getty Museum, Los Angeles, CA

V.A. Solé, European Synchrotron Radiation Facility, Grenoble, France

The workshop will review the current status and exploit the challenges and perspectives for XRF calibration and quantification of cultural heritage materials using fundamental parameter-based methodologies. Applications using handheld analyzers, laboratory or portable milli- or 2D/3D micro- XRF instrumentation for a variety of samples from paper to metals will be demonstrated to illustrate concepts. Best practices that can improve data reproducibility and assessment will be discussed also.

Tuesday pm **XRD**

Rietveld Analysis II | Evergreen A

Organizers & Instructors:

J.A. Kaduk, Poly Crystallography Inc. and Illinois Institute of Technology, Naperville, IL, kaduk@polycrystallography.com

S.T. Misture, NYS College of Ceramics at Alfred University, Alfred, NY, misture@alfred.edu

T. Degen, PANalytical B.V., Almelo, The Netherlands

Continuation of Rietveld Analysis I.

Tuesday pm **XRF**

Quantitative Analysis II | Evergreen C

Organizer & Instructors:

M. Mantler, Rigaku Corporation, Purkersdorf, Austria, michael.mantler@rigaku.com

B. Vrebos, PANalytical, Almelo, The Netherlands

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

Fundamental Parameters in XRF:

Fundamental parameters for XRF include all physical constants related to the excitation and measurement of X-rays such as attenuation coefficients (total, subshell, coherent/incoherent scattering), binding energies of electrons (hence also line energies), transition probabilities, probabilities for radiative and non-radiative transitions (Auger, Coster-Kronig), as well as data related to interactions by electrons. By convention, tube spectra are sometimes included also.

The following topics intend to complement, at an introductory level, the special session dedicated to fundamental parameters during the regular scientific part of DXC 2012:

1. Available collections of fundamental parameters. Sources for download.
2. Reliability of data as a function of element and line-energy (and related sub-shells). This refers in particular to the range of light elements and low energy lines (L, M-lines).
3. The influence of chemical state.
4. Propagation of errors in fundamental parameters to the analytical result (classical methods with reference materials; reference free methods).
5. The International Initiative on X-ray Fundamental Parameters.

XRF Sample Preparation | Evergreen D

Organizer & Instructors:

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

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

M.E. Provencher, Corporation Scientifique Claisse, Quebec, Canada

This workshop will discuss basic and fundamental considerations with respect to specimen preparation for XRF by pressed powder and fusion with a special session devoted to the preparation of plastics.

SPECIAL SESSIONS WEDNESDAY, 8 AUGUST

Wednesday am | *Evergreen Ballroom*

PLENARY SESSION:

New Frontiers in X-ray Analysis—Dedicated to the life and work of Robert L. Snyder

Chair: Scott Misture, NYS College of Ceramics at Alfred University, Alfred, NY, USA

8:30 Chairman of the Denver X-ray Conference Opening Remarks

W. Tim Elam, University of Washington, Seattle, WA, USA

Presentation of Awards:

2012 Birks Award

Awarded posthumously to John Criss

Plenary Session Remarks by the Chair

9:00 D-2 Diffraction Analysis and Atomistic Modeling of the Real Structure of Nanocrystalline Materials

Paolo Scardi, L. Gelisio, University of Trento, Trento, Italy

9:45 Break

10:15 D-74 Milestones That Gave Momentum to XRPD

Herbert E. Goebel, LabXA, Munich, Germany

11:00 F-10 New Dimensions in X-ray Microscopy

Janos Kirz, LBNL, Berkeley, CA, USA

Wednesday pm | **XRD & XRF** | *Evergreen A*

Cultural Heritage

Chairs: M.K. Donais, Saint Anselm College, Manchester, NH, USA

A. Karydas, International Atomic Energy Agency, Vienna, Austria

1:30 C-16 Invited—Seeing What Others Cannot See: X-ray Based Imaging and Spectroscopy of Paintings and Painters Materials

K. Janssens, University of Antwerp, Antwerp, Belgium

2:00 F-48 Applications of PXRF for Cultural Heritage Diagnostics: Rapid In-field Analysis at Khirbat Faynan, Jordan

L.D. Hahn, K. Bennalack, T.E. Levy, University of California, San Diego, CA, USA

2:20 F-70 X-ray Fluorescence (XRF) Assisted, Multispectral Imaging of Historic Drawings

S. Stout, M. Seracini, UCSD, La Jolla, CA, USA

2:40 F-49 Scanning MACRO-XRF Investigation of Caravaggio's "St. Francis in Meditation"

M. Alfeld, G. van der Snickt, K. Janssens, University of Antwerp, Antwerp-Wilrijk, Belgium

M. Cardinali, M.B. De Ruggieri, M. Positano, Emmebi Diagnostica Artistica, Rome, Italy

3:00 Break

SPECIAL SESSIONS *WEDNESDAY, 8 AUGUST*

3:30 F-86 *Invited*—PXRF and Archaeological Obsidian: Calibration, Quantification, and the Analysis of Small Samples

J.R. Ferguson, University of Missouri Research Reactor Center, Columbia, MO, USA

4:00 F-73 PXRF Analysis of Iron Age Pottery in Western Sicily: Exchange and Transformation

W.M. Balco, University of Wisconsin-Milwaukee, Milwaukee, WI, USA

4:20 F-64 Gem Stone Analysis with EDX

R.E. Phillips, P. Lemberge, A. Seyfarth, Thermo Scientific, Madison, WI, USA

C.M. Breeding, Gemological Institute of America, Carlsbad, CA, USA

4:40 F-13 Elemental Distribution in Biological and Art Heritage Samples by Using an Imaging Gaseous Detector Based System

A.L.M. Silva, J.F.C.A. Veloso, University of Aveiro, Aveiro, Portugal

M.L. Carvalho, Atomic Physics Centre, University of Lisbon, Lisboa, Portugal

5:00 F-96 *Invited*—X-ray Fluorescence Integrate by Molecular Spectroscopies for the Non Invasive Studies of Paintings

C. Miliani, CNR-ISTM and Centro di Eccellenza SMAArt, Università di Perugia, Perugia, Italy

Wednesday pm | **XRD & XRF** | *Evergreen D*

New Developments in XRD & XRF Instrumentation

Chairs: T. Fawcett, International Centre for Diffraction Data, Newtown Square, PA, USA

T. Blanton, Eastman Kodak Company, Rochester, NY, USA

12:30 C-13 Novel Multilayer Designs Demonstrating Near Lossless Reflectivities

S. Mandal, J.R. Salisbury, B.J. Scherer, S.M. Lee, GE Global Research, Niskayuna, NY, USA

12:42 C-20 Tailored Solutions Using Multilayer Optics in X-ray Analyses

R. Dietsch, T. Holz, M. Kraemer, D. Weissbach, AXO DRESDEN GmbH, Dresden, Germany

H. Borrmann, Max Planck Institute for Chemical Physics of Solids, Dresden, Germany

S. Griessl, Huber Diffraktionstechnik, Rimsting, Germany

12:54 C-9 A New Multilayer X-ray Photonic Device

B.J. Scherer, S. Mandal, S.M. Lee, General Electric Global Research Center, Niskayuna, NY, USA

1:06 D-29 High Brilliance Micro-focus Sources for X-ray Diffractometry

P. Radcliffe, J. Schmidt-May, A. Kleine, J. Wiesmann, C. Michaelsen, Incoatec GmbH, Geesthacht, Germany

1:18 D-60 Modular SAXS-WAXS Systems with Micro-focus Source and Advanced Collimation

P. Høghøj, S. Rodrigues, P. Panine, Xenocs, Sassenage, France

1:30 F-55 Moxtek's New Optimag X-ray Sources: Performance Characterizations

S. Cornaby, D. Reynolds, R. Steck, D. Wang, J. Smith, C. Jensen, Moxtek Inc, Orem UT, USA

1:42 C-12 New Experimental Results with the PNCCD Color X-ray Camera

I. Ordavo, PNDetector GmbH, Munich, Germany

S. Ihle, A. Liebel, H. Soltau, PNSensor GmbH, Munich, Germany

A. Bjeoumikhov, IFG - Institute for Scientific Instruments GmbH, Berlin, Germany

O. Scharf, Institut für angewandte Photonik eV (IAP), Berlin, Germany

L. Strüder, MPI Halbleiterlabor, Otto-Hahn-Ring 6, 81739 München, Germany

SPECIAL SESSIONS *WEDNESDAY, 8 AUGUST*

1:54 F-57 XRF Performance Information with Moxtek's Mini X-ray Sources & Detectors

S. Cornaby, S. Kamtekar, Moxtek Inc, Orem UT, USA

2:06 F-42 Comparison of Transparent Windows for Large Area Radiation Detectors

M. Bornschlegl, O. Jaritschin, PNDetector GmbH, München, Germany

B. Schweinfest, H. Soltau, PNSensor GmbH, München, Germany

L. Andricek, MPI Halbleiterlabor, München, Germany

2:18 D-27 A New Energy-dispersive Position Sensitive Detector

A. Kern, Bruker AXS, Karlsruhe, Germany

2:30 F-40 New Detector Systems and Measurements Results of Very Large Area SDDs for Synchrotron and Particle Physics Applications

A. Niculae, M. Bornschlegl, R. Eckhardt, J. Herrmann, O. Jaritschin, S. Jeschke, L. Mungenast, J. Treis, PNDetector GmbH, München, Germany

P. Lechner, H. Soltau, PNSensor GmbH, München, Germany

O. Zimmer, aSPECT Collaboration, Institute Laue-Langevi, Grenoble, France

L. Strüder, MPI Halbleiterlabor, München, Germany

2:42 F-8 Improved High Performance Silicon Drift Detectors

A. Pahlke, R. Fojt, T. Eggert, M. Fraczek, L. Höllt, J. Knobloch, KETEK GmbH, Munich, Germany

2:54 Break

3:15 C-3 Model Based Signal Processing for a High Rate Digital Pulse Processor

P.A.B. Scoullar, C.C. McLean, Southern Innovation, Melbourne, Victoria, Australia

3:27 C-14 Super High Throughput with a Silicon Drift Detector and Advanced Pulse Processing Technology

S. Barkan, L. Feng, V.D. Saveliev, M. Takahashi, E.V. Damron, Y. Wang, SII NanoTechnology USA Inc., Northridge, CA, USA

P. Grudberg, J. Harris, XIA LLC, Hayward, CA, USA

P. Scoullar, C. Mclean, Southern Innovation, Melbourne, Australia

3:39 C-11 Performance Comparison of "Cube" CMOS Preamplifier with Respect to JFET Front-end for SDD Readout

L. Bombelli, T. Frizzi, R. Alberti, XGLab SRL, Milano, Italy

C. Fiorini, A. Longoni, Politecnico di Milano, Milano, Italy

3:51 D-54 New Incident and Detector Side Components for Laboratory X-ray Diffraction

B. Jones, B. He, H. Ress, Bruker AXS, Madison, WI, USA

C. Olligner, G. Vanhoyland, A. Kern, Bruker AXS, Karlsruhe, Germany

4:03 D-64 The PANalytical Difference

M. Fransen, PANalytical, Almelo, The Netherlands

4:15 F-58 A Novel Micro-XRF for In-Situ Geological Exploration of Other Planets

L.A. Wade, R. Hodyss, A. Allwood, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, U

N. Gao, XOS Inc., East Greenbush, NY, USA

K. Kozaczek, Moxtek Inc., Orem, UT, USA

SPECIAL SESSIONS WEDNESDAY, 8 AUGUST

4:39 F-81 Application of Peltier Cooled X-ray Detector for Radioisotope Induced EDXRF

D. Joseph, Nuclear Physics Division, BARC, Mumbai, India

4:51 F-82 The X-5000 Bench-top EDXRF Analysis of Shale in Oil Producing Fields

J. Brum, Olympus ANI, Inc., Woburn, MA USA

5:03 F-52 Grade Control of Ore and Industrial Minerals with a New XRF Instrument Design

K. Behrens, F. Portala, A. Buman, P. de Pape, Bruker-AXS, Madison, WI, USA

5:15 F-63 Thermo Scientific's New XRF Products

D. Bonvin, C. Shaffer, R. Yellepeddi, Thermo Scientific, Ecublens, Switzerland

A. Seyfarth, Thermo Scientific, Madison, WI, USA

A. Martin, Thermo Scientific, Sugar Land, TX, USA

Wednesday pm | **XRD** | *Evergreen B*

Stress Analysis

Chair: D. Brown, Los Alamos National Laboratory, Los Alamos, NM, USA

1:30 D-38 Invited—Stresses in Mineralized Tissues

S.R. Stock, Northwestern Univ., Chicago, IL, USA

J.D. Almer, Argonne National Lab., Argonne, IL, USA

2:00 D-10 Invited—Comparing Residual Stress Measurements Using Diffraction and Mechanical Techniques

A.T. DeWald, Hill Engineering, LLC, Rancho Cordova, CA, USA

M.R. Hill, University of California, Davis, CA, USA

M.B. Prime, B. Clausen, D.W. Brown, Los Alamos National Laboratory, Los Alamos, NM, USA

2:30 D-40 Integrating Known Models with Evolutionary Algorithms to Characterize Distortions in Image Data

J.C. Schuren, AFRL, WPAFB, OH, USA

M. Schmidt, Nutonian Inc., Boston, MA, USA

2:50 D-8 Analysis of the Deformation Behavior of Mg-RE and Mg-Li Alloys Using In-situ Energy-dispersive Synchrotron X-ray Diffraction

M. Lentz, W. Reimers, Technische Universität Berlin, Berlin, Germany

3:10 Break

3:40 D-13 Characterization of Residual Stress Gradient in Electroplated Coatings Using X-ray Diffraction

L. Tarkowski, P. Indyka, E. Beltowska-Lehman, Institute of Metallurgy and Materials Science of Polish Academy of Sciences, Krakow, Poland

4:00 D-16 Influence of the Load Character on the Martensitic Transformation Kinetics in a Trip Steel: A Synchrotron X-ray Diffraction Study

E. Cakmak, H. Choo, University of Tennessee, Knoxville, TN, USA

K. An, Spallation Neutron Source, Oak Ridge National Laboratory, Oak Ridge, TN, USA

Y. Ren, X-ray Science Division, Argonne National Laboratory, Argonne, IL, USA

SPECIAL SESSIONS WEDNESDAY, 8 AUGUST

4:20 D-45 Neutron and X-ray Residual Stress Mapping in Vehicle Turbocharger Shaft Wheel Assemblies

C.R. Hubbard, T. Watkins, Oak Ridge National Laboratory, Oak Ridge, TN, USA
J. Bunn, University of Tennessee, Knoxville, TN, USA
S. Chaudhury, K. Pattabiramen, Honeywell Turbo Technologies, Torrance, CA, USA

4:40 D-49 Minimize the Effect of Texture and Grain Size on Stress Analysis with 2D Detector

B.B. He, Bruker AXS, Madison, WI, USA

5:00 D-75 Neutron Diffraction Study of Residual Stress in a Multi-pass Gas Tungsten Arc Weld

T.A. Sisneros, D.W. Brown, B. Clausen, J.O. Milewski, M. Stienzig, Los Alamos National Laboratory, Los Alamos New Mexico, USA

Wednesday pm | **XRF** | *Evergreen C*

Fusion and Industrial Applications of XRF

Chair: J.A. Anzelmo, *Anzelmo & Associates, Inc., Madison, WI*

2:00 F-89 Research on the Development of Sample Preparation Methods for Sn-Pb Solders and Their Correct Analysis by Wavelength Dispersion X-ray Fluorescence Spectrometry

T.Gorewoda, J. Anyszkiewicz, Z. Mzyk, Institute of Non-Ferrous Metals, Gliwice, Poland

2:20 F-91 Micro X-ray Fluorescence for Identification of Particles in Manufacturing Processes

L.L. Brehm, Dow Chemical Company, Midland, MI, USA
M. Alpeter, D. Kwasneski, P. Ortiz, V. Mercier, Dow Chemical Company, Seadrift, TX, USA
D. Burns, Dow Chemical Company, Freeport, TX, USA

2:40 F-21 XRF Analysis Using Borate Fusion for Characterization of Major Components in Mesoporous Silica Nanoparticles Comprising the Inclusion of Gadolinium

M. Bouchard, A. Milliard, Corporation Scientifique Claisse®, Quebec City, Canada
R. Guillet-Nicolas, F. Kleitz, M.-A. Fortin, Université Laval, Quebec City, Canada

3:00 Break

3:30 F-20 ISO 9615-1 Simplified Borate Fusion/WDXRF Analytical Method for Iron Ore Including Total Iron Analysis

S. Ness, Intertek, Genalysis, Perth, Australia
M. Bouchard, C.O. Arsenault, Corporation Scientifique Claisse®, Quebec City, Canada
K. Behrens, D. Porta, Bruker-AXS GmbH, Karlsruhe, Germany

3:50 F-66 Analyze This! Point and Shoot Analysis of Unknowns with WDXRF

D. Bonvin, K. Juchli, Thermo Scientific, Ecublens, Switzerland
A. Seyfarth, Thermo Scientific, Madison, WI, USA
A. Martin, Thermo Scientific, Sugar Land, TX, USA

4:10 F-61 Analysis of Gypsum and Carbonate Rocks Using a New Silicon Drift Detector Based EDXRF Instrument

K. Behrens, F. Portala, S. Durali-Mueller, Bruker-AXS, Karlsruhe, Germany
D. Pecard, Bruker-AXS, Madison, Wisconsin

4:30 F-30 Using the Micro-spot Analysis Function and Mapping Capability of a Bulk WDXRF Instrument for Forensic Industrial Applications

L. Oelofse, Rigaku Americas Corp, The Woodlands, TX, USA

SPECIAL SESSIONS THURSDAY, 9 AUGUST

Thursday am | **XRD & XRF** | *Evergreen A*

Improved Fundamental Parameters

Chairs: **T. Jach**, National Institute of Standards & Technology, Gaithersburg, MD, USA
W.T. Elam, University of Washington, Seattle, WA, USA

9:00 F-5 Invited—Comparing Existing Mac Tables – Hints to Possible Developments

P. Caussin, Bruker-AXS, Champs sur Marne, France

9:30 F-19 The International Workshops on X-ray Fundamental Parameters

T. Jach, National Institute of Standards and Technology, Gaithersburg, MD, USA
B. Beckhoff, Physikalisch-Technische Bundesanstalt, Berlin, Germany
M.-C. Lépy, LNE/Laboratoire National Henri Becquerel, Gif-sur-Yvette, France
M. Mantler, Rigaku Corp., Tokyo, Japan

9:50 F-37 Modeling XRF Intensities for Portable/Handheld Analyzers Using Fundamental Parameters Approach

A.G. Karydas, R. Padilla-Alvarez, A. Markowicz, IAEA Laboratories, Seibersdorf, Austria
D. Sokaras, Stanford Synchrotron Radiation Lightsource, Menlo Park, CA, USA
M. Drozdenko, National Academy of Sciences of Ukraine, Sumy, Ukraine
V. Kantarelou, NCSR Demokritos, Athens, Greece

10:10 Break

10:40 F-17 Invited—High-resolution X-ray Emission Spectroscopy: A Powerful Technique for Inner-shell Atomic Physics and Fundamental Parameters Determination

J.-C. Dousse, University of Fribourg, Fribourg, Switzerland

11:10 F-51 Microcalorimeter Spectrometers for High Resolution Spectroscopy between 30 and 400 KEV

J.N. Ullom, D.A. Bennett, R.D. Horansky, D.R. Schmidt, W.B. Doriese, C.P. Fitzgerald, J.W. Fowler, G.C. Hilton, K.D. Irwin, V. Kotsubo, G.C. O'Neil, C.D. Reintsema, F. Schima, NIST, Boulder, CO, USA
A.S. Hoover, R. Winkler, M.W. Rabin, Los Alamos National Laboratory, Los Alamos, NM, USA

11:30 F-24 XRF Analysis of High Gain-on-ignition Sample by the Fusion Method Using the Fundamental Parameter Method

H. Inoue, Y. Yamada, M. Watanabe, Y. Kataoka, Rigaku Corporation, Takatsuki, Osaka, Japan
L. Oelofse, M. Feeney, Rigaku Americas Corporation, The Woodlands, Texas, USA

Thursday am | **XRD** | *Evergreen B*

Rietveld Analysis I

Chair: **Q. Huang**, National Institute of Standards & Technology, Gaithersburg, MD, USA

9:00 D-47 Invited—X-ray Powder Diffraction Structural Studies of Novel Hydrogen Storage Materials

H. Wu, National Institute of Standards and Technology, Gaithersburg, MD, USA

9:30 D-48 Quantitative X-ray Diffraction Application in Amorphous Content Determination of Crystallized Glass Seals

T. Jin, M. Naylor, S. Misture, New York State College of Ceramics at Alfred University, Alfred, NY, USA

SPECIAL SESSIONS THURSDAY, 9 AUGUST

9:50 D-17 Crystal Structures of Group 1 Citrate Salts

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

A. Rammohan, American International University, Woodridge, IL, USA

10:10 Break

10:40 D-65 Application of Powder Diffraction and Rietveld Analysis in Superconductors

Q. Huang, NIST Center for Neutron Research, Gaithersburg, MD, USA

11:00 D-73 Kinetic Study of Crystallization Mechanisms of Aurivillius Phases by In-situ X-ray Diffraction

J. Shi, R. J. Koch, I.N. Lokuhewa, M.S. Haluska, S.T. Misture, Alfred University, Alfred, NY, USA

Thursday am | **XRD** | *Evergreen C*

Industrial Applications and Energy Materials I

Chairs: E.A. Payzant, Oak Ridge National Laboratory, Oak Ridge, TN, USA

T.R. Watkins, Oak Ridge National Laboratory, Oak Ridge, TN, USA

M. Rodriguez, Sandia National Laboratory, Albuquerque, NM, USA

9:00 D-67 Invited—XRD and XRF Techniques for Industrial Research of Advance Electrified Vehicle Energy Storage Devices

K.J. Rhodes, Ford Motor Company, Dearborn, MI, USA

9:30 D-70 Invited—A Synergistic Electron Nanodiffraction and X-ray Diffraction Study of Thin Film Functional Materials

J.Y. Howe, M.J. Kirkham, Z. Gai, Oak Ridge National Laboratory, Oak Ridge, TN, USA

10:00 D-50 The Structural Characterization of a New Form of Clenbuterol (Clenbuterol Hemihydrate) a Well Known Decongestant and Bronchodilator, Also Used as a Performance-enhancing Drug

J.M. Delgado, R. Toro, G. Díaz de Delgado, Universidad de Los Andes, Mérida, Venezuela

10:20 Break

10:50 D-15 Microbeam X-ray Diffraction on TRIP Steels: From Powder Data to Single Grains and Subgrains

R. Blondé, E. Jimenez-Melero, N.H. van Dijk, E. Brück, L. Zhao, J.P. Wright, S. van der Zwaag, Delft University of Technology, Delft, The Netherlands

11:10 D-34 Integration of Microfocus XRD with Scanning Electron Microscopy, Electron Probe Microanalysis and Scanning Thermal Diffusivity Microscopy

L.N. Squires, K.E. Wright, M.K. Fig, T.P. O'Holleran, J.R. Kennedy, Idaho National Laboratory, Idaho Falls, ID, USA

T. Hartmann, University of Nevada Las Vegas, Las Vegas, NV, USA

11:30 D-9 X-ray Analysis of PbSe Nanocrystal Superlattice Films

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

C. Perkins, National Renewable Energy Laboratory, Golden, CO, USA

R. Ihly, M. Law, University of California Irvine, Irvine, CA, USA

SPECIAL SESSIONS *THURSDAY, 9 AUGUST*

11:50D-41 Probing Zone Boundary Phonons at the Nanoscale

G. Gopalakrishnan, K. McElhinny, P. Evans, University of Wisconsin, Madison, WI, USA
M. Holt, D. Czaplewski, Center for Nanomaterials, Argonne National Laboratory, Argonne, IL, USA

Thursday am | **XRF** | *Evergreen D*

Handheld XRF Applications

Chair: K.A. Russell, Olympus Innov-X, Woburn, MA, USA

9:00 F-87 Invited—Overview of Handheld XRF Applications for Soil Science

D. Weindorf, LSU AgCenter, Baton Rouge, LA, USA

9:30 F-27 X-ray Spectroscopy as a Tool for Process Control in Biorefineries

M. Thyrel, T.A. Lestander, Swedish University of Agricultural Sciences, Unit of Biomass Technology and Chemistry, Umeå, Västerbotten, Sweden

9:50 F-35 Portable XRF and “Halogen Free” Requirements: Low-level Chlorine and Bromine Analysis in Polymer Materials

B. Connors, B. Tannian, J. Koch, Olympus Innov-X, Woburn, MA, USA

10:10 Break

10:40 F-53 Invited—Use of Handheld XRF for Consumer Product Testing in the Undergraduate Chemistry Curriculum

P.T. Palmer, San Francisco State University, San Francisco, CA, USA

11:10 F-16 Portable XRF in the Undergraduate Chemistry Curriculum

M.K. Donais, Saint Anselm College, Manchester, NH, USA

11:30 F-12 Use of Handheld XRF in Catalytic Converter Recycling

M. Cameron, Bruker Elemental, Kennewick, WA, USA

11:50 F-95 Advantages of Measuring Lead in Paint by XRF Using Areal Mass Approach

S. Piorek, Thermo NITON Analyzers, LLC, Billerica, MA, USA

Thursday pm | **XRD & XRF** | *Evergreen A*

X-ray Imaging

Chair: B. Patterson, Los Alamos National Laboratory, Los Alamos, NM, USA

2:00 C-21 Invited—Scanning Versus Full-field Micro-XRF Imaging Using a Novel Energy-dispersive X-ray CCD Camera

L. Vincze, B. De Samber, J. Garrevoet, B. Vekemans, Ghent University, Ghent, Belgium
O. Scharf, A. Bjeoumikhov, IfG-Institute for Scientific Instruments GmbH, Berlin, Germany
R. Wedell, Institut für Angewandte Photonik e.V. (IAP), Berlin, Germany
M. Vandegehuchte, C. Janssen, Ghent University, Ghent, Belgium

SPECIAL SESSIONS THURSDAY, 9 AUGUST

2:30 D-37 X-ray Diffraction Imaging for Predictive Metrology of Crack Propagation in Large Diameter Silicon Wafers

B.K. Tanner, M.C. Fossati, Durham University, Durham, UK
J. Wittge, A.N. Danilewsky, University of Freiburg, Freiburg, Germany
D. Allen, P.J. McNally, Dublin City University, Dublin, Ireland
D. Jacques, Jordan Valley Semiconductors UK Ltd, Durham, UK
J. Garagorri, M.R. Elizalde, University of Navarra, San Sebastián, Spain

2:50 D-46 Progressive Structural Decomposition Analysis Using In-situ Digital Radiography

T. Wypych, University of California San Diego, La Jolla, CA, USA
F. Kuester, University of California San Diego, La Jolla, CA, USA

3:10 C-7 Development and Benchmarking of a First-principles Model of Highly-ordered Pyrolytic Graphite X-ray Optical Elements

Y. Van Haarlem, J. Tickner, CSIRO, Kirrawee, NSW, Australia

3:30 Break

3:50 C-4 *Invited*—Nanoscale Chemical Imaging of Energy Materials with Full-field Transmission X-ray Microscopy

J.C. Andrews, Y. Liu, J. Nelson, P. Pianetta, Stanford Synchrotron Radiation Lightsource, Menlo Park, CA, USA
F. Meirer, Fondazione Bruno Kessler; Povo, Italy

4:20 C-1 Characterization of Low Density Materials Using 3D X-ray Characterization Techniques

B.M. Patterson, C.E. Hamilton, K.A. Obrey, Z. Smith, R. Gilbertson, G.J. Havrilla, Los Alamos National Laboratory, Los Alamos, NM, USA

4:40 F-83 *Invited*—X-ray Fluorescence Elemental Imaging Using Micro, Confocal and DCC Instrumentation

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

Thursday pm | **XRD** | *Evergreen B*

Rietveld Analysis II

Chair: Q. Huang, National Institute of Standards & Technology, Gaithersburg, MD, USA

2:00 D-66 *Invited*—Harnessing the Power of High-resolution Synchrotron Powder Diffraction for (Your) Rietveld Analysis

M. Suchomel, L. Ribaud, Argonne National Laboratory, Argonne, IL, USA

2:30 D-51 In-situ Characterization of Spinel-supported Nanoparticulate Metal Catalysts

K.C. Glass, B. Hill, S.T. Misture, Alfred University, Alfred, NY, USA

2:50 D-28 Quantitative Analysis of Carbides in Ni-based Superalloy for Gas Turbine Blade

H. Lee, D. Kim, K. Yoo, K. Song, Korea Electric Power Company Research Institute, Daejeon, Korea

3:10 Break

SPECIAL SESSIONS THURSDAY, 9 AUGUST

3:40 D-76 Invited—Selected Applications of Rietveld-XRD Analysis of Aluminum Industry Materials

F.R. Feret, Feret Analytical Consulting, Saint-Colomban, Quebec, Canada

4:10 D-26 Analytical Method for Observed Powder Diffraction Intensity Data Based on Maximum Likelihood Estimation

T. Ida, Nagoya Institute of Technology, Tajimi, Gifu, Japan

F. Izumi, National Institute for Materials Science, Tsukuba, Ibaraki, Japan

Thursday pm | **XRD** | *Evergreen C*

Industrial Applications and Energy Materials II

Chairs: E.A. Payzant, Oak Ridge National Laboratory, Oak Ridge, TN, USA

T.R. Watkins, Oak Ridge National Laboratory, Oak Ridge, TN, USA

M. Rodriguez, Sandia National Laboratory, Albuquerque, NM, USA

2:00 D-69 Invited—Size Matters: In this New Realm of Nanotechnology the Industrial X-ray Characterization Market still requires Macro Solutions

P. LaPuma, H. Ress, B. Jones, J. Giencke, M. Sunder, Bruker AXS Inc., Madison, WI, USA

2:30 D-21 A High-speed Crystal Orientation Mapping System for Multi Crystalline Silicon Solar Cells

A. Haase, M. Klatt, A. Schafmeister, R. Stabenow, GE Sensing & Inspection Technologies GmbH, Ahrensburg, Germany

S.M. Lee, GE Global Research, Niskayuna, NY, USA

E. Meissner, T. Geiger, C. Reimann, M. Trempa, Fraunhofer IISB, Department Crystal Growth, Erlangen, Germany

T. Lehmann, Fraunhofer THM, Freiberg, Germany

2:50 D-39 Invited—Rapid Analysis of Natural Gas Bearing Shale Using Next Generation 2-D Portable PXRD

T.C. Jennison, B. Boyer, W. Brunner, P. Sarrazin, K. Stehr, Olympus ANI, Campbell, CA, USA

3:10 D-22 Measuring the Local Biaxial Stress State in the Diffuse Neck During Uniaxial Mechanical Testing

M.A. Iadicola, NIST, Gaithersburg, MD, USA

3:30 Break

4:00 D-25 High-temperature XRD Study of the $\text{Th}_6\text{Mn}_{23}$ Phase in Ti-Al-Ru Alloys

S. Rajsiri, E. Ryba, The Pennsylvania State University, University Park, PA, USA

J. Bai, Brookhaven National Laboratory, Upton, NY, USA

4:20 D-57 Identification of Soot Generated from Laser Processing of Titanium Alloys

R.G. Baggerly, Boeing Research & Technology, Seattle, WA, USA

4:40 D-55 Modern Applications for 2 Dimensional X-ray Diffraction

J. Giencke, B. Jones, H. Cordes, M. Sunder, B. He, Bruker AXS, Madison, WI, USA

SPECIAL SESSIONS THURSDAY, 9 AUGUST

Thursday pm | **XRF** | *Evergreen D*

Trace Analysis

Chair: **M.A. Zaitz**, IBM, Hopewell Junction, NY, USA

2:00 F-26 Invited—TXRF Analysis of Environmental and Biological Samples

K. Tsuji, S. Kaku, T. Ohmori, T. Yoshioka, Osaka City University, Osaka, Japan

2:30 F-34 Distribution of Trace Elements in the Mineralized Matrix of Human Osteosarcoma Tissue

B. Pemmer, C. Weixelbaumer, M. Foelser, P. Wobrauschek, TU Wien, Atominstitut, Vienna, Austria

A. Roschger, Ludwig Boltzmann Institute of Osteology at the Hanusch Hospital of WGKK and AUVA Trauma Centre Meidling, Vienna, Austria

J.G. Hofstaetter, Vienna General Hospital, Medical Univ. of Vienna, Vienna, Austria

2:50 F-93 Characterization of Dried Blood Spots by Wavelength Dispersive X-ray Fluorescence (WDXRF) and Supporting Instrumentation High Resolution Inductively Coupled Plasma – Mass Spectrometry (SF-ICP-MS)

A.C. McWilliams, F.X. Weber, K.E. Levine, Research Triangle Institute, Research Triangle Park, NC, USA

A.A. Martin, Thermo Fisher Scientific, Sugar Land, TX, USA

3:10 F-84 HIRX Detection of Plutonium in Contaminated Soil

G.J. Havrilla, M.C. Collins, V.M. Montoya, H. Boukhalfa, Los Alamos National Laboratory, Los Alamos, NM, USA

3:30 Break

3:50 F-43 On-line Slurry Analysis by EDXRF Using a 50 MM² SDD

S. Barkan, L. Feng, V.D. Saveliev, M. Takahashi, E.V. Damron, Y. Wang, SII NanoTechnology USA Inc., Northridge, CA, USA

T. Strombotne, Process Engineering Resources Inc., Salt Lake City, UT, USA

4:10 F-9 Design of an In-situ XRF Instrument for Elemental Diffusion Measurements

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

T. Grundl, University of Wisconsin-Milwaukee, Milwaukee, WI, USA

O.X. Leupin, NAGRA, Wettingen, Switzerland

M. Descostes, Areva Bg Mines, Paris La Defense Cedex, France

4:30 F-18 High Resolution Grazing Emission X-ray Fluorescence Technique: A Powerful Tool for Material Characterization

J. Hozowska, Y. Kayser, S.H. Nowak, J.-Cl. Dousse, University of Fribourg, Fribourg, Switzerland

SPECIAL SESSIONS *FRIDAY, 10 AUGUST*

Friday am | **XRD** | *Evergreen A*

Line Profile Analysis

Chairs: **I. Cernatescu**, *Pratt and Whitney, East Hartford, CT*
T. Ungár, *Eotvos University, Budapest, Hungary*

8:30 D-14 Invited—Beyond X-ray Line Profiles: Perceiving Dislocation Structures from High Resolution Reciprocal Space Mapping

W. Pantleon, *Technical University of Denmark, Kongens Lyngby, Denmark*

9:00 D-30 Modification of Line Profile Analysis Methods for Thin Film Materials Study

A. Benediktovitch, *Belarusian State University, Minsk, Belarus*
A. Ulyanenko, *Rigaku Europe SE, Berlin, Germany*

9:20 D-53 Experiment Demonstration of the Absorption Broadening of XRD Line Profile by Two Kinds of the Crystals of Silicon

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

9:40 D-68 Time-resolved Study of a Silver Nanoparticle Self-assembly into a 3D Nanocrystal at Micro-GISAXS Beamline at PETRA III

K. Vegso, P. Siffalovic, M. Jergel, E. Majkova, M. Weis, S. Luby, *Institute of Physics, Slovak Academy of Sciences, Bratislava, Slovakia*
A. Buffet, M.A. Kashem, J. Perlich, S.V. Roth, *HASYLAB/DESY, Hamburg, Germany*

10:00 Break

10:20D-43 Invited—Characterizing Twinning and Stacking Fault Activity by X-ray and Neutron Diffraction Line Profile Analysis

L. Balogh, *Los Alamos National Laboratory, Los Alamos, NM, USA*
T. Ungár, *Eotvos University, Budapest, Hungary*

10:50 D-35 The Certification of SRM 1979 for Analysis of Crystallite Size

J.P. Cline, J.J. Ritter, D. Black, D. Windover, A. Henins, J.E. Bonevich, J.J. Filliben, *NIST, Gaithersburg, MD*

11:10 D-62 Invited—Extending Line-profile-analysis to Textured materials and Neutron-diffraction

T. Ungár, *Eotvos University, Budapest, Hungary*

11:40 D-24 Structural Study of Nanostructured Cr-Co Based Alloys by X-ray Diffraction Line Profile Analysis

S. Loudi, F.Z. Bentayeb, W. Tebib, *Université Badji-Mokhtar, Annaba, Algérie*
A.M. Mercier, *Université du Maine, Le Mans, France*

SPECIAL SESSIONS *FRIDAY, 10 AUGUST*

Friday am | **XRF** | *Evergreen B*

Quantitative Analysis

Chair: L. Brehm, *Dow Chemical Company, Midland, MI, USA*

8:30 F-47 Invited—Quantitative XRF Analysis at Trace Level: Concepts and Approaches

W.-L. Shen, *The Dow Chemical Company, Freeport, TX, USA*

9:00 F-14 Invited—Residual Metals Analysis in the Pharmaceutical Industry: A Comparison of TXRF, ICP-MS and AAS

A.R. Diaz, A.J. Jensen, Y. Xiang, F.J. Antosz, *Pfizer Inc., Groton, CT, USA*

9:30 F-67 Minimizing Uncertainties in the XRF Analysis of Atmospheric Particulate Matter (PM) Through Calibration with Standards that Mimic PM Samples

H. Indresand, A.M. Dillner, *University of California, Davis, CA, USA*

9:50 F-50 Validation and Traceability of XRF and SEM-EDS Elemental Analysis Results for Solder in High-reliability Applications

J.R. Sieber, *National Inst. of Stand. & Tech., Gaithersburg, MD, USA*

A. Mortensen, *Hi-Rel Laboratories, Inc., Spokane, WA, USA*

10:10 Break

10:30 F-11 Synthetically Generated Reference Spectra for X-ray Fluorescence Calibration with Application to the On-line Measurement of Fluorochemical Concentration on Carpet Fibers

R. Gullayanon, *King Mongkut Institute of Technology Latkrabang, Latkrabang, Bangkok, Thailand*

T.E. Michaels, *Georgia Institute of Technology, Atlanta, GA, USA*

10:50 F-56 Comparison of XRF, TXRF, and ICP-MS Methods for Determination of Mercury in Face Cream

P.T. Palmer, *San Francisco State University, San Francisco, CA, USA*

G. Vrdoljak, *CA Dept. of Public Health, Richmond, CA, USA*

R. Jacobs, *FDA Division of Field Science, Alameda, CA, USA*

11:10F-59 The Average Oxidation State of Sulfur by X-ray Spectrometry

R.W. Morton, S. Soyer-Uzun, *ConocoPhillips, Bartlesville, OK, USA*

11:30 F-92 Novel WDXRF Solution for Zinc and Lead Analysis in Widely Varying Matrices Using Multiple, Simultaneous Calibration Routines

K.L. Lackey, *Teck, Inc., Red Dog Mine, Anchorage, AK, USA*

A. Martin, *ThermoARL, Sugar Land, TX, USA*

11:50 F-60 Flexibility and Performance of WDXRF Spectrometers for Successful Quality and Process Control in Modern Steel Production

K. Behrens, F. Portala, A. Buman, D. Porta, *Bruker-AXS, Karlsruhe, Germany*

SPECIAL SESSIONS WEDNESDAY, 8 AUGUST

Friday am | **XRF** | *Evergreen C*

Micro XRF

Chair: **G. Havrilla**, *Los Alamos National Laboratory, NM, USA*

8:30 F-28 Invited—Confocal XRF Xanes Analysis of the Cathode Electrolyte Interface of Lithium-ion Batteries

M. Menzel, U.E.A. Fittschen, M. Fröba, A. Schlifke, Institute of Inorganic and Applied Chemistry, University of Hamburg, Hamburg, Germany

9:00 F-25 Invited—Development of a Vacuum Confocal Micro-XRF Instrument and its Applications

K. Tsuji, T. Nakazawa, Osaka City University, Osaka, Japan

9:30 C-6 X-ray Fluorescence and Diffraction Mapping of Dentin at 200 NM

S.R. Stock, A.C. Deymier-Black, A. Veis, E. Lux, A. Telsner, Northwestern Univ., Chicago, IL, USA
S. Wang, Z. Cai, Advanced Photon Source, Argonne National Lab., Argonne, IL, USA

9:50 Break

10:10 C-10 Characterization of Thermoelectric Materials by Synchrotron Micro-X-ray Fluorescence and Diffraction

U.E.A. Fittschen, K-G. Reinsberg, M. Menzel, J.A.C. Broekaert, Institute of Inorganic and Applied Chemistry, Hamburg, Germany;
C. Schumacher, K. Nielsch, Institute of Applied Physics, Hamburg, Germany

10:30 F-44 Biological Applications of X-ray Imaging and Spectroscopy: Implications for Drug Design

J. Ward, S. Vogt, Argonne National Laboratory, Argonne, IL, USA
R. Marvin, T. O'Halloran, Northwestern University, Evanston, IL, USA
D. Mustafi, U. Dougherty, G. Karczmar, University of Chicago, Chicago, IL, USA
J. Penner-Hahn, University of Michigan, Ann Arbor, MI, USA

10:50 F-22 Application of Micro-XRF for Nuclear Material Forensics and Problem Solving

C.G. Worley, L. Tandon, P.T. Martinez, D.L. Decker, Los Alamos National Laboratory, Los Alamos, NM, USA

11:10 F-85 Ultra High Energy X-ray Fluorescence Application to Uranium Detection

G.J. Havrilla, M.L. Collins, V.M. Montoya, Los Alamos National Laboratory, Los Alamos, NM, USA
W.T. Elam, University of Washington, Seattle, WA, USA
S. Shastri, A. Mashayekhi, Argonne National Laboratory, Argonne, IL, USA

11:30F-69 High-Resolution, Energy-dispersive, Soft-X-ray Spectroscopy via Arrays of Microcalorimeters

W.B. Doriese, C.P. Fitzgerald, J.W. Fowler, G.C. Hilton, K.D. Irwin, V. Kotsubo, L. Miaja-Avila, C.D. Reintsema, D.R. Schmidt, D.S. Swetz, J. Uhlig, J.N. Ullom, L.R. Vale, National Institute of Standards and Technology, Boulder, CO, USA
D.A. Fischer, C. Jaye, National Institute of Standards and Technology, Gaithersburg, MD, USA

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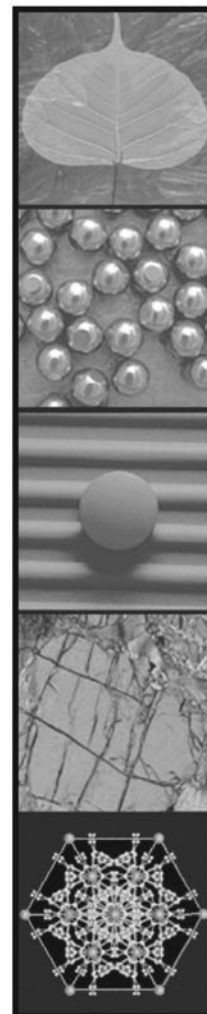
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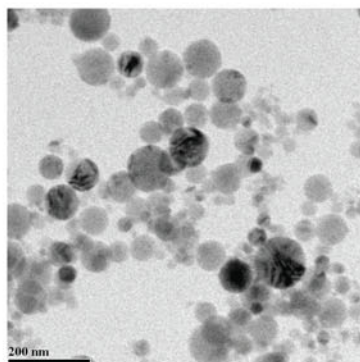


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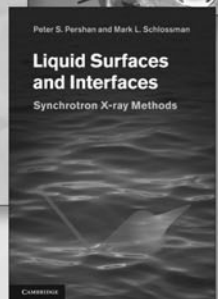
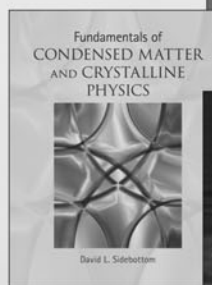
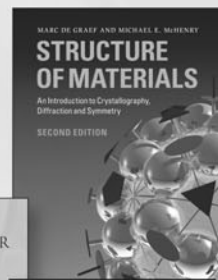
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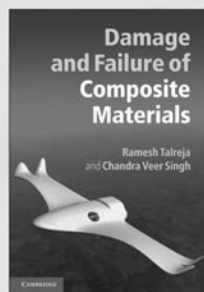
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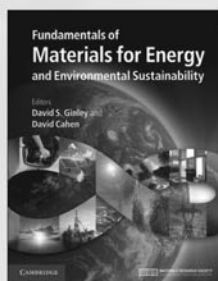
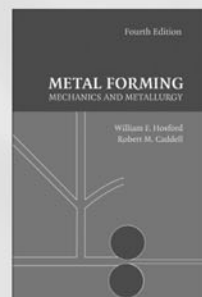


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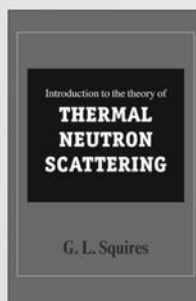
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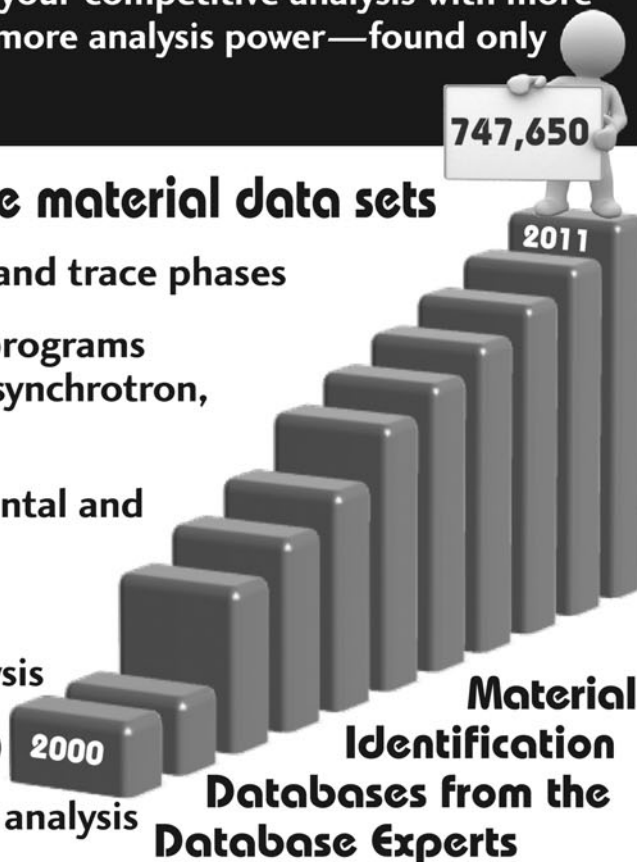
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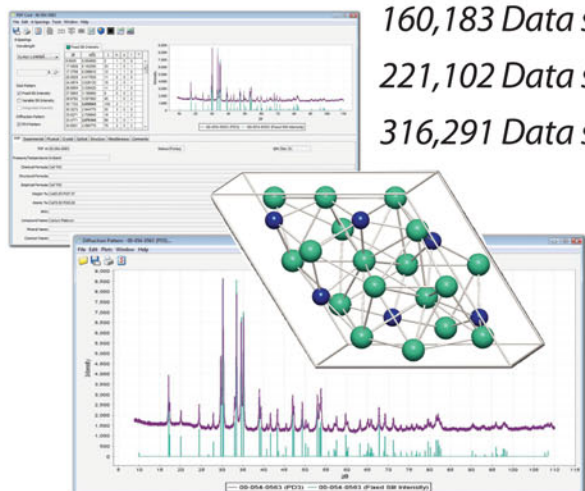
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