

59th Annual Conference on Applications of X-ray Analysis

DENVER X-RAY CONFERENCE®

DENVER X-RAY CONFERENCE PROGRAM

2–6 August 2010

Denver Marriott Tech Center Hotel, Denver, Colorado, U.S.A.



materialstoday



PLENARY SESSION:

"The Greening of X-rays:
X-rays and Renewable Energy"

Training & Applications

Techniques & Instrumentation

Exhibits, Workshops, Sessions

Free CD of the Proceedings

JOINT MEETING WITH THE NORTH AMERICAN
CORE SHELL SPECTROSCOPY CONFERENCE

Cultural Heritage Workshop & Session supported by:
Bruker

Polymer Workshop & Session supported by:
Bruker PANalytical Rigaku



Sponsored by

International Centre for Diffraction Data



59TH DENVER X-RAY CONFERENCE 2–6 AUGUST 2010

DENVER MARRIOTT TECH CENTER HOTEL, DENVER, COLORADO, U.S.A.

2010 DENVER X-RAY CONFERENCE ORGANIZING COMMITTEE

Chair, **Robert Snyder**, *Georgia Institute of Technology, Atlanta, GA, bob.snyder@mse.gatech.edu*

Co-Chair, **W. Tim Elam**, *Ametek/EDAX Research Group and Univ. of Washington APL, Seattle, WA, wtelam@apl.washington.edu*

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Scott Mixture, *NYS College of Ceramics at Alfred University, Alfred, NY, mixture@alfred.edu*

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

Brian Toby, *Argonne Natl. Lab., Advanced Photon Source, Argonne, IL, brian.toby@anl.gov*

René van Grieken, *Univ. of Antwerp, Antwerp, Belgium, rene.vangrieken@ua.ac.be*

Mary Ann Zaitz, *IBM, Hopewell Junction, NY, zaitz@us.ibm.com*

Future DXC Dates

1-5 August 2011

Crowne Plaza Hotel, Colorado Springs, CO

6-10 August 2012

Denver Marriott Tech Center Hotel, Denver, CO

5-9 August 2013

The Westin Westminster, Westminster, CO

Program & Online Registration

This program and online registration are also available on the Denver X-ray Conference web page at www.dxcicdd.com. The information contained in this program is current as of the printing date. Changes will be communicated at the conference.

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GENERAL INFORMATION

Accommodations

The 2010 Denver X-ray Conference will be held at the: **Denver Marriott Tech Center Hotel**

4900 S. Syracuse Street, Denver, CO 80237, U.S.A.

phone: 1.800.228.9290 (or dial direct: 1.303.779.1100) fax: 1.303.740.2523

web site: [www.marriott.com/property/property page/DENTC](http://www.marriott.com/property/property.page/DENTC)

The special conference rate of \$139 per night (plus tax) is applicable until Friday, 16 July 2010, subject to availability. Please do not wait to book your reservation – there are a limited number of rooms available at the special conference rate! Attendees are responsible for making their own reservations. Please call 1.800.228.9290 and identify yourself as a Denver X-ray Conference attendee when booking your reservation. The web site for online reservations is: resweb.passkey.com/Resweb.do?mode=welcome_ei_new&eventID=1454471. All reservations must be accompanied by a first night room deposit, or guaranteed with a major credit card.

Ground Transportation/Shuttle Service

Big Sky Airport Shuttle is available for service and is offering a special rate of \$18.00 one way and \$24.00 round trip to and from the Denver International Airport. Please use group code "ICDD" when making your reservations. You can purchase your tickets online by visiting their web site at www.bigskyshuttle.com. Please call 303.300.2626 or 1-877.336.8267 if you have any questions. After arriving in Denver, you may also purchase your tickets at the ticket counter inside the DIA terminal. The Big Sky Shuttle counter is located across from the tourist information booth and next to the RTD counter. For your convenience, please refer to our group name (ICDD) when purchasing your tickets.

Poster Boards

The poster boards used during the evening poster sessions will be 4' high x 8' wide boards. Authors must bring their own thumbtacks or Velcro. Poster boards will be set in the atrium outside the exhibit hall. Posters must be set 15 minutes prior to the start of the session, and can be removed at the end of the session, or if the author chooses, by 4:00 pm the following day. The area is not secured; ICDD is not responsible for any posters left by the author(s).

Employment Clearinghouse

We will have a separate bulletin board to announce employment opportunities. Prospective employers should bring announcements with them for posting.

Book of Abstracts

The DXC *Book of Abstracts* will be available at the Conference Registration Desk. To view the abstracts before the conference, visit our web site: www.dxcicdd.com. Abstracts are listed in alphabetical order by the contact author's last name, and are searchable.

Registration Details

All on-site registrations will be conducted at the Conference Registration Desk, located on the ground floor (level one) of the Denver Marriott Tech Center Hotel, outside the Evergreen Ballroom. See the hotel layout on page 29 of this Program for the exact location.

Registration Times:

Sunday, 1 August 4:00 pm–7:00 pm

Monday, 2 August 8:00 am–3:00 pm

Tuesday, 3 August 8:00 am–3:00 pm

Wednesday, 4 August 8:00 am–2:00 pm

Thursday, 5 August 8:00 am–2:00 pm

Evening Poster Sessions & Social Events

Spouses and families are welcome to attend all social functions. Wine & Cheese Receptions and Poster Sessions will be held in the exhibit hall (Rocky Mountain Event Center) and the atrium outside the exhibit hall, unless otherwise noted.

Monday 2 August 5:30–7:30 pm

XRD Poster Session and Wine & Cheese Reception

Sponsored by Thermo Scientific & the International Centre for Diffraction Data

Tuesday 3 August 5:30–7:30 pm

XRF Poster Session and Wine & Cheese Reception

Sponsored by Chemplex Industries, Inc.

Thursday 5 August

An Off-site activity will be planned for Thursday evening. Visit the web site for details: www.dxcicdd.com.

Spouses' Coffee Hour

All spouses are invited to attend a complimentary coffee hour, sponsored by the Denver X-ray Conference. Coffee, tea and pastries will be served in the Conifer 2 Room from 9:30 to 10:30 am on Monday and Tuesday. Information on local attractions and activities of interest will be provided.

GENERAL INFORMATION

Visa Application Notice

Obtaining a Visa is the sole responsibility of the attendee. The Denver X-ray Conference is not permitted to mediate with either the U.S. Embassy abroad or with the State Department on behalf of any conference attendee. However, if you need an invitation letter to the conference to submit with your application, please e-mail your request to: flaherty@icdd.com. Please include your name, passport #, birth date, mailing address, e-mail address, and the title(s) of any abstract(s) that you have submitted for the conference. A copy of the letter will be e-mailed and airmailed to you.

Conference Proceedings

Don't miss this opportunity to showcase your research by submitting your presented paper for the DXC conference proceedings, *Advances in X-ray Analysis*, Volume 54 on CD. Work presented during either an oral session or poster session is eligible for submission. Select papers will also be published in the journal, *Powder Diffraction*. Instructions for preparation and submission of manuscripts will be e-mailed to authors and posted online at: www.dxcicdd.com/advances/authors.htm. The deadline for submission is 1 September 2010.

Note: To be acceptable for publication, papers should describe either new methods, theory and applications, improvements in methods or instrumentation, or other state-of-the-art advances. Papers emphasizing commercial aspects are discouraged.

Advances in X-ray Analysis is distributed throughout the world, and the complete manuscripts of volumes 40 – 50 (1996 – 2006) can also be viewed on the ICDD web site: www.dxcicdd.com/advances/advances.htm.

Sponsorship Opportunities

There are various sponsorships available to exhibitors of the Denver X-ray Conference. Please visit our web site: www.dxcicdd.com for details or contact Denise Flaherty: flaherty@icdd.com, 610.325.9814.

Have an idea for a workshop or session?

Visit: <http://www.dxcicdd.com/workshopsuggestions.htm> to submit your ideas!

STUDENT INFORMATION

Discount Rooms

There are a limited number of hotel rooms being offered to students at a discounted rate of \$70 per night plus tax. Student rooms are shared—each room will be equipped with two double beds to accommodate two persons. Please visit the Denver X-ray Conference web site: www.dxcicdd.com for a Student Room Authorization form. Student identification will be required. Rooms will be booked on a first-come, first-serve basis.

Grants

In pursuing its dynamic commitment to the education of the scientific community, the International Centre for Diffraction Data is offering limited travel support to help students attend the 2010 Denver X-ray Conference. Grants are awarded in the amount of \$500 for students living within the USA, and \$1,000 for students living outside of the USA. Denver X-ray Conference also offers a reduced student registration fee and student housing. (See www.dxcicdd.com for full details). Students are required to participate in the technical program by submitting an abstract for poster or oral presentation. To apply for assistance, download a copy of the Student Grant Application form, and submit with a copy of your abstract and a supporting letter from your research advisor. The deadline for applications is 1 July 2010.

Jerome B. Cohen Student Award

This award was instituted in the name of Professor Jerome B. Cohen, one of the leaders in the field of X-ray analysis, and in the training of students in this art. The award is intended to recognize the outstanding achievements of student research in this field. All students, graduate or undergraduate, who are working in the field of X-ray analysis, can submit a technical paper describing their work. The following criteria applies:

- The research must be original, of high quality, and must be primarily the work of the student.
- All papers submitted for the Cohen Award must be presented at the conference in either oral or poster session. Thus, all first-author students must submit an abstract and also attend the conference.
- The papers submitted for this competition must be received in final publication form electronically by 1 July 2010. The winning manuscript will also be listed in the conference proceedings.

The winner will be selected by a committee of researchers in the field, and notified one week before the conference. The winner must be able to attend the Plenary session of the conference on Wednesday morning for the announcement of the award. The award for the year 2010 will be in the amount of \$1,000. Students interested in participating in this year's competition must submit their papers and a certification form to dxc@icdd.com by 1 July 2010. The certification form and instructions for preparing a manuscript can be obtained on the Denver X-ray Conference web site: <http://www.dxcicdd.com>.

EXHIBIT INFORMATION

Exhibits will be held in the Rocky Mountain Event Center, on the ground floor of the hotel.

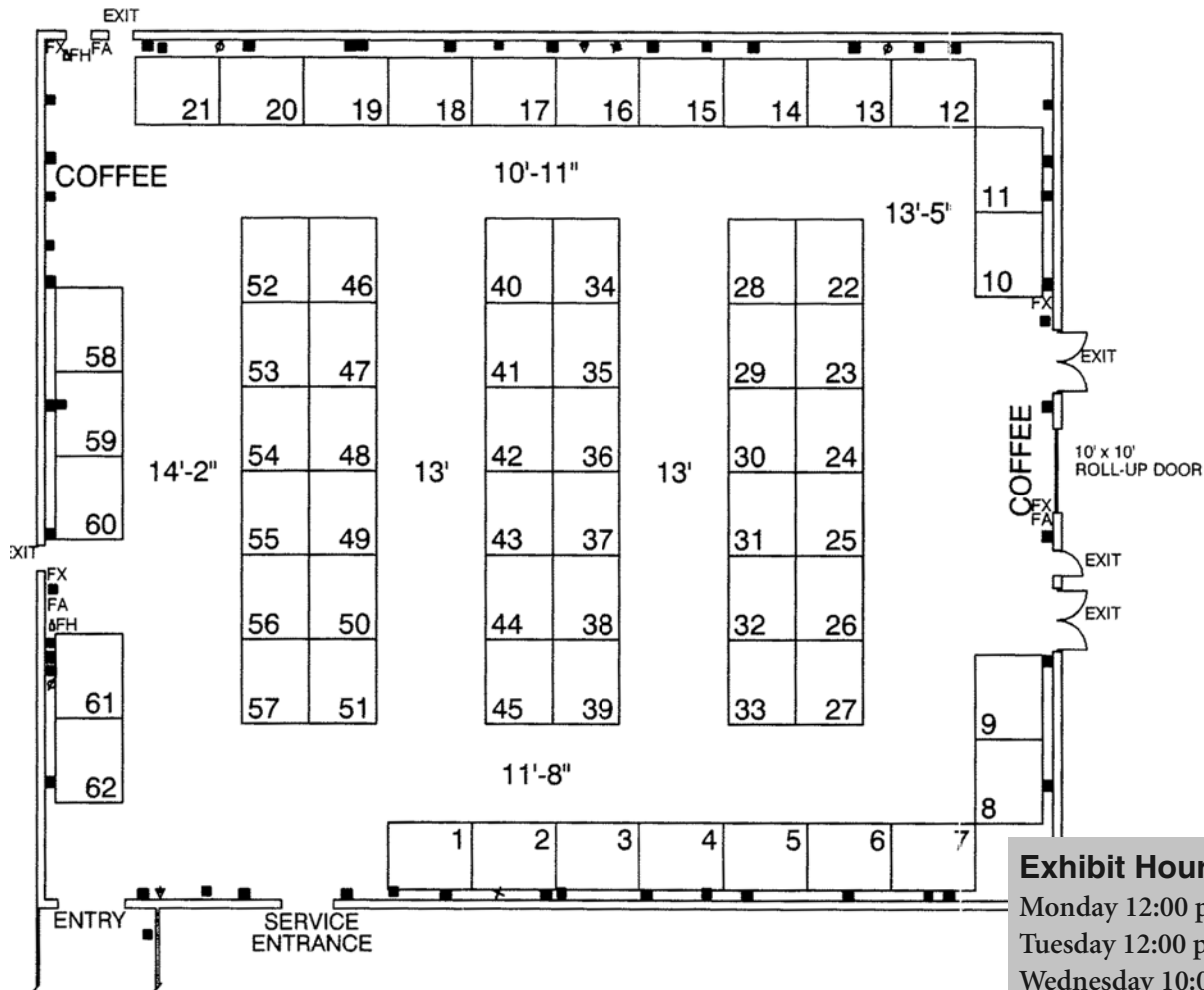


Exhibit Hours:

Monday 12:00 pm–7:30 pm
 Tuesday 12:00 pm–7:30 pm
 Wednesday 10:00 am–5:00 pm
 Thursday 10:00 am–1:00 pm

2010 Denver X-ray Conference Exhibit Assignments (as of 1 April)

Company Name	Booth #(s)	Company Name	Booth #(s)
AMPTek Inc	1	Oxford Cryosystems	58
Blake Industries, Inc.	6	PANalytical	10,11,12,13
Bruker AXS	43, 44, 45, 50, 51	PNDetector GmbH	19
Brush Wellman Electrofusion Products	33	Premier Lab Supply, Inc	26
Chemplex Industries	62	Proto Manufacturing Inc.	27
Corporation Scientifique Claisse, Inc	3	Rigaku Americas Corp.	37, 38, 39
e2v Scientific Instruments	54	Rigaku Innovative Technologies, Inc	32
Hecus X-Ray Systems	61	Rocklabs Limited	22
Horiba Scientific	52	SPEX Sample Prep LLC	48
Huber Diffraktionstechnik - AXO DRESDEN GmbH	7	Thermo Scientific - Niton Analyzers	55
IMP Group PTY LTD	47	Thermo Scientific - Scientific Instruments	56, 57
INCOATEC GmbH	49	Wiley-Blackwell	59
Innov-X Systems Inc	2	Xenocs SA	24
International Centre for Diffraction Data	20, 21	XGLab S.R.L.	46
Materials Data Inc (MDI)	60	XIA LLC	25
Micromatter (AAPS)	53	X-Ray Optical Systems, Inc	8, 9

Monday Morning 9:00 am – 12:00 pm

XRD

SURVEY OF BASIC XRD APPLICATIONS

EVERGREEN A

Organizer & Instructors:

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

T. Blanton, Eastman Kodak Company, Rochester, NY

M. Rodriguez, Sandia National Laboratories, Albuquerque, NM

This ½ day workshop will survey various applications of XRD analysis, including in-situ analyses and neutron diffraction. The analyses will include phase ID, crystallite size and microstrain, preferred orientation and texture, lattice parameters and solid solutions, and residual stress. Brief overviews of high-temperature in-situ analysis, neutron diffraction and synchrotron studies will be included.

TRACE PHASE IDENTIFICATION USING CHEMICAL INFORMATION

EVERGREEN C

Organizers and Instructors:

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

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

We have all been challenged at some point in trying to identify important materials in complex mixtures based on a minimum (1-2 lines) amount of diffraction data. Even the best batch processed phase identification software often has difficulty with minor and trace phase identification (1-10 weight %) simply due to a lack of statistical significance in the data. However, most of the time the analyst knows some information about the specimen that is not reflected in the XRD data. The analyst may know the sample history, type of sample, and some knowledge of the chemistry, physical properties or observational behavior (i.e., hardness, bubbles with acid). Tools such as relational databases, LeBail refinement, pattern simulations and Rietveld refinements can be used to search and find information about a sample that provides significance when coupled with just a few observations in your diffraction data. This workshop will use actual examples, demonstrating both the tools and processes, for successfully identifying the needles in a haystack. We will focus on the methods and tools used after the bulk phases have been identified, that will enable you to identify the minor and trace components. The tools and processes can help a good analyst become a great analyst!

TEXTURE ANALYSIS I

EVERGREEN D

Organizer & Instructors:

H. Schaeben, Freiberg University of Mining & Technology, Freiberg, Saxony, Germany, schaebe@geo.tu-freiberg.de

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

R. Hielscher, Helmholtz Zentrum München; GSF - Forschungszentrum für Umwelt und Gesundheit, Neuherberg, Germany

F. Bachmann, Technische Universität Bergakademie Freiberg, Freiberg, Germany

Texture analysis is a method to quantify the pattern of crystallographic preferred orientation in polycrystalline materials like metals, rocks or ceramics. This workshop will cover:

1. A brief introduction into the basic mathematics of practical texture analysis from the point of view of Radon transforms and computer tomography.
2. An extensive introduction into the free and open source Matlab® toolbox MTEX (<http://code.google.com/p/mtex/>) to compute an orientation density function (odf) from experimental pole intensity data, e.g., area detector data, and its characteristic properties as harmonic coefficients, texture index, mode, volume portions, etc.

Attendees are asked to bring their own computer notebook, if possible equipped with a recent MATLAB license to do hands-on exercises by themselves.

XRF

STANDARDS AND ADVANCED SAMPLE PREPARATION FOR XRF ANALYSIS

EVERGREEN B

Organizer & Instructors:

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

K. Nakano, Osaka City University, Osaka, Japan

U. Fittschen, University of Hamburg, Hamburg, Germany

B. Beckhoff, Physikalisch-Technische Bundesanstalt, Berlin, Germany

This workshop will introduce standard materials for quantitative XRF analysis of trace or major elements in metals, plastics, soils, and other matrices. The emphasis will be on understanding how to prepare the calibration standards, as well as reference-free XRF analysis. A demonstration on how to evaluate analytical performance of micro-XRF by using micro-structured materials will be provided. Additionally, the workshop will include a discussion on sample preparation using pico-droplets and pre-concentration techniques, which are useful for trace analytical techniques such as TXRF.

Monday Afternoon 2:00 – 5:00 pm

XRD

TWO-DIMENSIONAL DETECTORS

EVERGREEN A

Organizers & Instructors:

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

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

M. Kobas, DECTRIS Ltd., Baden, Switzerland

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

J. Ferrara, Rigaku Americas Corporation, 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.

TEXTURE ANALYSIS II

EVERGREEN D

Organizer & Instructors:

H. Schaeben, Freiberg University of Mining & Technology, Freiberg, Saxony, Germany, schaeben@geo.tu-freiberg.de

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

R. Hielscher, Helmholtz Zentrum München; GSF - Forschungszentrum für Umwelt und Gesundheit, Neuherberg, Germany

F. Bachmann, Technische Universität Bergakademie Freiberg, Freiberg, Germany

Continuation of Texture Analysis I.

XRF

TRACE ANALYSIS

EVERGREEN B

Organizer & Instructors

J. Heckel, SPECTRO Analytical Instruments, Kleve, Germany, jheckel@spectro.com

Description not available as of printing date. Please monitor our web site for up-to-date information.

BASIC XRF

EVERGREEN C

Organizer & Instructors:

T. Elam, Ametek/EDAX Research Group and University of Washington APL, Seattle, WA, wtelam@apl.washington.edu

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

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.

Tuesday Morning 9:00 am – 12:00 pm

XRD & XRF

CULTURAL HERITAGE I

EVERGREEN A

Organizers & Instructors:

M. Walton, Getty Conservation Institute, Los Angeles, CA, mwalton@getty.edu

K. Eremin, Harvard Art Museum, Cambridge, MA, katherine_eremin@harvard.edu

A. Bezur, The Museum of Fine Arts, Houston Conservation, Houston, TX

A. Drews, Ford Research & Advanced Engineering, Ford Motor Company, Dearborn, MI

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

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

This workshop will be focused on the use of XRF and XRD to analyze works of art. The instructors will discuss both the general use of these techniques and their limitations, as well as the specialized issues surrounding the use of this instrumentation on works of art. An emphasis will be placed this year on the characterization of ceramics, glazes, and glasses which often contain difficult-to-analyze light elements. Discussions will therefore be centered on the optimization of portable XRF instruments for the analysis of these materials.

USING FEFF TO MODEL REAL-WORLD SYSTEMS

EVERGREEN E&F

Organizers & Instructors:

C. Segre, Illinois Institute of Technology, Chicago, IL, segre@iit.edu

J. Kas, University of Washington, Seattle, WA

A. Frenkel, Yeshiva University, New York, NY

FEFF 9 is the most recent release of the FEFF ab initio self-consistent multiple-scattering code for simultaneous calculations of excitation spectra and electronic structure. This program is able to calculate extended X-ray-absorption fine structure (EXAFS), full multiple scattering calculations of various X-ray absorption spectra (XAS) and projected local densities of states (LDOS). The spectra include X-ray absorption near edge structure (XANES), X-ray natural and magnetic circular dichroism (XNCD and XMCD), spin polarized X-ray absorption spectra (SPXAS and SPEXAFS), non-resonant X-ray emission spectra (XES), the X-ray scattering amplitude (Thomson and anomalous parts), and electron energy loss spectroscopy (EELS). The workshop will provide attendees with an overview of the newest features of the program, examples of using FEFF 8 to model real-world systems and some hands-on examples.

XRD

PAIR DISTRIBUTION FUNCTION

EVERGREEN B

Organizer & Instructor:

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

This workshop will provide a brief refresher on the PDF's fundamentals and hands-on training on experimental XRD data, both in-house and synchrotron, reduction into PDFs, as well as fitting of structure models to experimental PDFs. Attendees are encouraged to bring laptops and data sets of their own.

POLYMERS I (SUPPORTED BY BRUKER, PANALYTICAL AND RIGAKU)

EVERGREEN C

Organizers & Instructors:

S. Murthy, Rutgers University, Piscataway, NJ, murthy@biology.rutgers.edu

B. Landes, Dow Chemical Company, Midland, MI, bglandes@dow.com

C. Burger, SUNY – Stony Brook, Stony Brook, NY

J. Ilavsky, Advance Photon Source/Argonne National Laboratory, Argonne, IL

G. Beaucage, University of Cincinnati, Cincinnati, OH

B. Lee, Advance Photon Source/Argonne National Laboratory, Argonne, IL

Small-angle X-ray scattering (SAXS) is a well established technique in many areas (biology, materials science, metallurgy, polymer and colloid physics) for analyzing structures at the colloidal length scale (10-100's nm). It is a powerful metrology technology that can be used to describe the size, size distribution, shape, density, volume fraction, order/disorder, and interfaces of moieties in multiphase systems. The workshop will discuss SAXS theory, instrumentation, data analysis / interpretation, and structural modeling. The presenters will discuss examples from the field of polymers, ceramics, biological systems, and particulate materials. Software packages that can be used in the analysis of the data and specific analysis methods will be described. A relatively new technique for the analysis of long-range structure near surfaces, grazing incidence SAXS (GISAXS), will be discussed. Each of the lectures will cover specific means of data collection, the models used to interpret the data, and the techniques for analyzing the data to get meaningful information. Specific topics that are of broad interest and falling within the scope can be submitted for consideration in advance to murthy@biology.rutgers.edu.

XRF

QUANTITATIVE ANALYSIS I

EVERGREEN D

Organizer & Instructors:

M. Mantler, Purkersdorf, Austria, michaelmantler@aon.at

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

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

MORNING: Basic methods of quantitative analysis:

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

AFTERNOON: Advanced methods of quantitative analysis:

1. Interpretation of spectra and full spectrum modeling.
2. Coherent and incoherent scattering.
3. Analysis of thin films/layers.

Tuesday Afternoon 2:00 pm – 5:00 pm

XRD & XRF

CULTURAL HERITAGE II

EVERGREEN A

Organizers & Instructors:

M. Walton, Getty Conservation Institute, Los Angeles, CA, mwalton@getty.edu
K. Eremín, Harvard Art Museum, Cambridge, MA, katherine_eremin@harvard.edu
A. Bezur, The Museum of Fine Arts, Houston Conservation, Houston, TX
A. Drews, Ford Research & Advanced Engineering, Ford Motor Company, Dearborn, MI
J. Dik, Delft University of Technology, Delft, The Netherlands
K. Trentelman, Getty Conservation Institute, Los Angeles, CA

Continuation of Cultural Heritage I.

XRD

POLYMERS II

EVERGREEN C

Organizers & Instructors:

S. Murthy, Rutgers University, Piscataway, NJ, murthy@biology.rutgers.edu
B. Landes, Dow Chemical Company, Midland, MI, bglandes@dow.com
C. Burger, SUNY – Stony Brook, Stony Brook, NY
J. Ilavsky, Advance Photon Source/Argonne National Laboratory, Argonne, IL
G. Beaucage, University of Cincinnati, Cincinnati, OH
B. Lee, Advance Photon Source/Argonne National Laboratory, Argonne, IL

Continuation of Polymers I.

XRF

SPECIMEN PREPARATION XRF

EVERGREEN B

Organizer & Instructors:

J. Anzelmo, Anzelmo & Associates, Inc., Madison, WI, jaanzelmo@aol.com
P. Grine, Vesuvius, Bettsville, OH
L. Ottmar, Millennium Inorganic Chemicals, A Cristal Company, Glen Burnie, MD

This workshop will cover the basics of XRF Sample Preparation including sampling techniques and equipment needed. Preparation of powder briquettes and fusion beads, and the techniques and equipment used for manual and automated methods will be discussed. Fusion techniques will include both borate and peroxide methods. Powder methods will include sample reduction methods necessary before specimen preparation. Materials to be covered include alumino-silicates, acidic and basic minerals, refractories, geological, mining, cement and associated raw materials.

QUANTITATIVE ANALYSIS II

EVERGREEN D

Organizer & Instructors:

M. Mantler, Purkersdorf, Austria, michaelmantler@aon.at
B. Vrebos, PANalytical B.V., Almelo, The Netherlands
W.T. Elam, University of Washington, Seattle, WA

Continuation of Quantitative Analysis I.

The Monday evening Poster Session will be held in the exhibit hall (Rocky Mountain Event Center) and the atrium outside the exhibit hall, in conjunction with exhibits and a Wine & Cheese Reception sponsored by Thermo Scientific and ICDD.

CHAIRS: **J.A. Kaduk**, Poly Crystallography, Inc., Naperville, IL
T.R. Watkins, Oak Ridge National Laboratory, Oak Ridge, TN

- D-40 'Calculated' Reference Patterns & 'Measured' Reference Scans: New Database Possibilities**
T. Degen, PANalytical B.V., Almelo, The Netherlands
- D-70 An Inexpensive Stage for Reflection Geometry Variable Temperature Diffraction Using an Off-The-Shelf Peltier Device**
A. Drews, Ford Research and Advanced Engineering, Dearborn, MI
- D-67 Fast Diffraction Studies with Microfocus Sources**
P. Panine, S. Rodrigues, B. Lantz, P. Høghøj, Xenocs SA, Sassenage, France
- D-63 High Brilliance Laboratory Sources for Small X-ray Beams**
C. Michaelsen, T. Samtleben, B. Hasse, J. Wiesmann, U. Heidorn, S. Kroth, F. Hertlein, Incoatec GmbH, Geesthacht, Germany
- D-79 SAXS Investigations of Solid Samples Using the New Multi-Purpose Variostage**
H. Santner, C. Resch, Anton Paar GmbH, Graz, Austria
- D-56 Polymers Characterized using In Situ Laboratory SAXS/WAXS Coupled with Mechanical Tests**
M. Feuchter, University of Leoben, Leoben, Austria
J. Keckes, Austrian Academy of Sciences and University of Leoben, Leoben, Austria
G.A. Maier, Materials Center Leoben, Leoben, Austria
- D-37 Your Synchrotron Powder Diffraction Instrument: 11-BM at the Advanced Photon Source**
B.H. Toby, M.R. Suchomel, R.B. Von Dreele, L. Ribaud, APS - Argonne National Laboratory, Argonne, IL
- D-6 An Alternative Voyage through Reciprocal Space**
K.D. Rogers, J. Rogers, A. Dicken, Cranfield University, Cranfield, Bedfordshire, UK
P. Evans, J.W. Chan, X. Wang, Nottingham Trent University, Nottingham, UK
- D-82 Functional Multilayer Optics – Graded Nanometer Multilayers as Polarizers and Bandpass Filters with Tunable Energy and Angular Resolution**
Th. Holz, R. Dietsch, M. Kraemer, D. Weissbach, AXO Dresden GmbH, Heidenau, Germany
- D-25 New X-ray Imaging Camera Gives Insight into X-ray Source Characteristics**
L. Pina, M. Horvath, Rigaku Innovative Technologies Europe, S.R.O., Prague, Czech Republic
N. Grupido, B. Ehlers, B. Kim, Rigaku Innovative Technologies, Inc., Auburn Hills, MI
- D-23 Topography as a Method to Evaluate X-ray Mirrors**
J.A. Maj, P. Fernandez, K. Lazarski, X. Huang, Argonne National Laboratory, Argonne, IL
- D-8 Scatter Enhanced X-ray Imaging**
A. Dicken, K. Rogers, J. Rogers, Cranfield Health, Cranfield University, Shrivenham, Swindon, UK
P. Evans, J.W. Chan, Nottingham Trent University, Nottingham, UK
- D-55 A Novel Sample Pressing Technique to Reduce Preferred Orientation Using the Back-Pressed Presentation Method**
N.A. Raftery, Queensland University of Technology, Brisbane, Australia

- D-34 Synchrotron X-ray Scattering Studies of Thin Film Interface Evolution**
A.P. Warren, T. Sun, B. Yao, K.R. Coffey, University of Central Florida, Orlando, FL
K. Barmak, Carnegie Mellon University, Pittsburgh, PA
M.F. Toney, Stanford Synchrotron Radiation Laboratory, Menlo Park, CA
- D-32 Evolution of Texture and Dislocations of High-Ductile Twip Steel During Deformation**
S. Sato, T. Yoshimura, K. Wagatsuma, S. Suzuki, Tohoku University, Sendai, Miyagi, Japan
N. Yamada, Bruker AXS K. K., Yokohama, Kanagawa, Japan
- D-64 Experimental Study of Minerals from Kimberlite of Yakutia**
O.E. Kovalchuk, L.V. Liskovaya, A.Ya. Rotman, ALROSA Co. Ltd., Mirny, Russia
- D-21 Theoretical Derivation of the X-ray Diffraction Line Profile Based on its Absorption**
K. Liu, H. Chen, Shanghai Institute of Tech, Shanghai, China
- D-18 Calculation of X-ray Stress Factors on the Basis of SO(3) Vector Parametrization**
A. Ulyanekov, Bruker AXS, Karlsruhe, Germany
A. Benediktovich, A. Zhilik, I. Feranchuk, Belarussian State University, Minsk, Belarus
T. Ulyanenkova, University of Karlsruhe, Karlsruhe, Germany
- D-72 X-ray Diffraction Techniques for Characterization of Thin Film Solar Cells**
I. Cernatescu, B. Litteer, S. Rekhi, PANalytical, Westborough, MA
J. Woitok, PANalytical, Almelo, The Netherlands
- D-71 Strain-Induced Texture Development in the Magnesium Alloy AZ31**
S. Huang, Shanghai Jiao Tong University, Shanghai, China
A. Drews, M. Li, J. Allison, Ford Research and Advanced Engineering, Dearborn, MI
- D-69 Low-Temperature XRD Studies of Lithium Battery Electrolytes Based on Ethylene Carbonate—Dimethyl Carbonate Mixtures**
A. Drews, J. Adams, M. Karulkar, R. Kudla, C. Paik, Ford Research and Advanced Engineering, Dearborn, MI
- D-65 The Phase Diagram Studies on the 2-Amino-2-methyl-1, 3-propanediol(AMPL) and tris (hydroxymethyl) aminomethane(TRIS) Binary System**
V.K. Kamisetty, D. Chandra, W.M. Chien, University of Nevada, Reno, NV
- D-57 Nano-Beam X-ray Diffraction Reveals Structural and Mechanical Gradients in Nano-Crystalline Thin Films**
J. Keckes, M. Bartosik, University Leoben, Leoben, Austria
G. Maier, Materials Centre Leoben, Leoben, Austria
M. Burghammer, ESRF, Grenoble, France
- D-46 In Situ Time-Resolved X-ray Diffraction of Tobermorite Formation Process Under Hydrothermal Condition: Influence of Reactive Al Compound**
K. Matsui, A. Ogawa, Asahi-KASEI Construction Materials Corporation, Sakai, Ibaraki, Japan
J. Kikuma, M. Tsunashima, T. Ishikawa, S. Matsuno, Asahi-KASEI Corporation, Fuji, Shizuoka, Japan
- D-38 High Temperature X-ray Diffraction Analyses of Monosodium Titanate & Sodium Peroxotitanate Resins**
D.M. Missimer, A.R. Jurgensen, R.L. Rutherford, Savannah River National Laboratory, Aiken, SC
- D-31 Refinement of Garnet Structure from Kimberlite of Yakutia**
L.V. Liskovaya, O.E. Kovalchuk, A.C. Ivanov, ALROSA Co. Ltd., Mirny, Russia
- D-9 Multialiquot Cell Approach for the SDPD of High Symmetry Compounds**
O.A. Smirnova, Kyoto University, Kyoto, Japan

- D-4 A Stepwise Approach for the X-ray Diffraction Data in Rietveld Refinement**
O.A. Smirnova, Kyoto University, Kyoto, Japan
- D-26 Species Identification of Bone Fragments: Development of a New Combined Method of Heat Treatment and X-ray Diffraction Analysis**
S. Beckett, K.D. Rogers, Cranfield University, Shrivenham, UK
J.G. Clement, The University of Melbourne, Melbourne, Australia
- D-27 XRD Winning Smiles: Analysis of Dental Calculus in Bioarchaeology**
S. Beckett, C. Greenwood, S. Ralph, K.D. Rogers, Cranfield University, Shrivenham, UK
K. Hardy, BioArch, University of York, York, UK
J.G. Clement, The University of Melbourne, Melbourne, Australia

Post Deadline Abstracts:

- D-102 Effect of Heat Treatment on Structure and Phase Transformation of $\text{RE}_2\text{Zr}_2\text{O}_7$ Powders Intended for Plasma Spraying of Ceramic Layers**
G. Moskal, T. Rzychoń, B. Witala, A. Rozmysłowska, Silesian University of Technology, Katowice, Poland
G. Dercz, University of Silesia, Katowice, Poland
- D-103 XRD Residual Stress Characterization of Air Plasma Sprayed Re-Zirconates Type of Ceramic Coatings**
G. Moskal, T. Rzychoń, B. Witala, A. Rozmysłowska, Silesian University of Technology, Katowice, Poland
G. Dercz, University of Silesia, Katowice, Poland
- D-104 Characterization of Biomedical Materials Using Low-Angle X-ray Scattering (LAXS) System**
N.A. Hussein, Garyounis University, Benghazi, Libya
A. Shukri, A.A. Tajuddin, Universiti Sains Malaysia, Penang, Malaysia
- D-105 Systematic Neutron Scattering Investigation of Structural Evolution in Pyrochlores at Low and High Temperatures**
A.S. Losko, S.C. Vogel, M. Patel, J. Rhyne, Los Alamos National Laboratory, Los Alamos, NM
- D-106 Small-Angle X-ray Scattering of Composite Polypropylene Films**
D.E. Temnov, E.E. Fomicheva, Herzen State Pedagogical University, Saint-Petersburg, Russia
B.A. Fedorov, A.V. Smirnov, Saint-Petersburg State University of Information Technologies, Saint-Petersburg, Russia
- D-107 In Situ High Temperature X-ray Diffraction Characterization of Silver Sulfide, Ag_2S**
T.N. Blanton, N. Dontula, Eastman Kodak Company, Rochester, NY
S.T. Mixture, Alfred University, Alfred, NY
- D-108 Effects of Cycling Hydrogen and Nitrogen Mixed Gases on Lithium Nitride Based Hydrogen Storage Materials**
W. Chien, J. Lamb, N.K. Pal, D. Chandra, University of Nevada, Reno, Reno, NV

The Tuesday evening Poster Session will be held in the exhibit hall (Rocky Mountain Event Center) and the atrium outside the exhibit hall, in conjunction with exhibits and a Wine & Cheese Reception sponsored by Chemplex Industries, Inc.

CHAIRS: **D. Rosenfeld**, E.I. DuPont de Nemours & Co., Wilmington, DE
R. Van Grieken, University of Antwerp, Antwerp, Belgium

F-69 Investigation of the Element Distribution in TXRF Samples Using Sr μ XRF

C. Horntrich, S. Smolek, A. Maderitsch, P. Kregsamer, C. Streli, Atominstitut, Vienna University of Technology, Vienna, Austria

R. Simon, Forschungszentrum Karlsruhe, Institut für Synchrotronstrahlung, Eggenstein-Leopoldshafen, Germany

A. Nutsch, Fraunhofer Institute for Integrated Systems and Device Technology, Erlangen, Germany

M. Knoerr, Fraunhofer Institute for Integrated Systems and Device Technology (ZKLM), Nürnberg, Germany

F-75 Grazing Incidence X-ray Absorption Applied to the Characterization of As Shallow Implants in Si

G. Pepponi, D. Giubertoni, S. Gennaro, E. Demenev, M. Bersani, MiNALab, CMM-Irst, Trento, Italy

F. Meirer, C. Streli, ATI, TU Wien, Vienna, Austria

M.A. Sahiner, Seton Hall University, South Orange, NJ

M.A. Foad, Applied Materials Inc., Santa Clara, CA

P. Pianetta, SSRL, Menlo Park, CA

F-21 Quantification of Sulfur Content in Polymer Films of Varying Thicknesses Using X-ray Fluorescence

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

F-64 Investigation of XSW Related Effects on Reference-Free Quantitation of Nanoparticles

J. Osán, S. Török, KFKI Atomic Energy Research Institute, Budapest, Hungary

F. Reinhardt, B. Beckhoff, Physikalisch-Technische Bundesanstalt, Berlin, Germany

A.E. Pap, Hungarian Academy of Sciences, Budapest, Hungary

F-63 Non-Destructive Chemical Speciation of Buried Interfaces by Absorption Spectroscopy at Grazing Incidence Conditions

R. Unterumsberger, B. Pollakowski, B. Beckhoff, Physikalisch-Technische Bundesanstalt, Berlin, Germany

W. Ensinger, P. Hoffmann, A. Klein, Technische Universität Darmstadt, Darmstadt, Germany

F-71 Levels and Spatial Distribution of Trace Elements in Bone Following Strontium Treatment in Calcium Deficient Rats

F. Meirer, Atominstitut, Technische Universität Wien, Vienna, Austria and Stanford Synchrotron Radiation Lightsource, Menlo Park, CA

J.G. Hofstaetter, Hanusch Hospital, Vienna, Austria and Vienna General Hospital, Vienna, Austria

S. Smolek, B. Pemmer, P. Wobrauschek, C. Streli, Atominstitut, Technische Universität Wien, Vienna, Austria

R. Simon, Forschungszentrum Karlsruhe GmbH, Eggenstein-Leopoldshafen, Germany

R.K. Fuchs, M.R. Allen, K.W. Condon, S. Reinwald, D.B. Burr, Indiana University, Indianapolis, IN

D. McClenathan, B. Keck, R.J. Phipps, Proctor and Gamble Pharmaceuticals, Mason, OH

F-46 Determination of Elemental Impurities in Active Pharmaceutical Ingredients According to Current Legislation by Using X-ray Fluorescence Spectrometry

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

C. Fontàs, M. Hidalgo, University of Girona, Girona, Spain

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

- F-45 Preconcentration Procedures Leading to Solid Thin Layers for Metal Determination in Liquid Analysis by X-ray Fluorescence Spectrometry**
E. Margu , I. Queral , Institute of Earth Sciences “Jaume Almera”, CSIC, Barcelona, Spain
C. Font s, M. Hidalgo, University of Girona, Girona, Spain
K. Van Meel, R. Van Grieken, University of Antwerp, Antwerp, Belgium
- F-35 Analysis of Plant Leaves Related To Remediation Studies in Post-Mining Areas by Laboratory Based Micro-XRF Spectrometry**
S. Smolek, C. Strel , Atominstytut TU Wien, Wien, Austria
E. Margu , I. Queral , Institute of Earth Sciences “Jaume Almera”, CSIC, Barcelona, Spain
P. Kregsamer, Atominstytut TU Wien, Wien, Austria
- F-5 Quantitative Analysis of Single Aerosol Particles with Confocal Micro X-ray Fluorescence Spectrometer**
T. Sun, Y. Li, Z. Liu, G. Wang, G. Zhu, X. Lin, P. Luo, Q. Pan, H. Liu, X. Ding, Beijing Normal University, Beijing, China
- F-67 High-Resolution Soft X-ray Emission Spectrometry Employed for the Determination of Atomic Fundamental Parameters Related to the Ni L- Fluorescence Process**
M. M ller, B. Beckhoff, Physikalisch-Technische Bundesanstalt, Berlin, Germany
B. Kanngie er, TU Berlin, Berlin, Germany
- F-42 Measurements of XRF Cross Sections and L_i ($i=1,2$) Sub-Shell Fluorescence Yields For Ho at 22.6 keV Incident Photon Energy**
A. Kumar, S. Puri, Punjabi University, Punjab, India
- F-58 Light Element Analysis by Portable XRF in Mining Applications**
M. Cameron, Bruker Elemental, Kennewick, WA
D. Cordier, USGS, Reston, VA
- F-53 Trace Element Analysis Using EDXRF with Polarized Optics**
T. Moriyama, S. Ikeda, M. Doi, Rigaku Corporation, Osaka, Japan
S. Fess, Applied Rigaku Technologies, Inc., Austin, TX
- F-43 The Device for Determination of Effective Atomic Number Materials**
I.A. Brytov, R.I. Plotnikov, A.D. Goganov, Saint Petersburg Electrotechnical University, Saint Petersburg, Russia
- F-25 Analytical Performance of Newly Developed 2D/3D-XRF Instruments**
T. Nakazawa, K. Nakano, K. Tsuji, Osaka City University, Osaka, Japan
- F-6 50 mm² Silicon Drift Detector in Compact T08 Housing**
A. Pahlke, T. Eggert, R. Fojt, L. Hoell , J. Knobloch, S. Pahlke, O. Scheid, R. Stoetter, F. Wiest, KETEK GmbH, Munich, Germany
- C-7 Magnetic Focusing Achieves Sub-100  m Spots with Mini X-ray Tubes**
S. Cornaby, Moxtek, Inc., Orem, UT
J. Steele, M. Hadley, O. Johnson, P. Jepsen, S. Rose, Brigham Young University, Provo, UT

Post Deadline Abstracts:

- F-77 New Advances in Standardless Analysis for XRF: Improvements for the Quantification of Challenging Industrial Samples**
K. Halkiotis, D. Coler, G. Wortman, PANalytical Inc., Westborough, MA
- F-78 Analysis of Fused Metal Alloys by WDXRF using MOXI, a Wide-Ranging-Oxide Application for Metals**
G. Wortman, D. Coler, K. Halkiotis, PANalytical Inc., Westborough, MA
- C-11 X-ray Absorption Spectroscopy of Changes in Ti Sites During Li Insertion in Nanostructured Anatase**
R. Apps, G. Mountjoy, University of Kent, Canterbury, Kent, UK
U. Lafont, TU Delft, Delft, The Netherlands

SESSIONS

WEDNESDAY, THURSDAY & FRIDAY 4–6 AUGUST.

THE CONFERENCE ENDS AT 12 NOON ON FRIDAY, 6 AUGUST.

WEDNESDAY AM—EVERGREEN BALLROOM

PLENARY SESSION

THE GREENING OF X-RAYS: X-RAYS AND RENEWABLE ENERGY

Chairs: **R.L. Snyder**, Georgia Institute of Technology, Atlanta, GA

B. Toby, APS, Argonne National Laboratory, Argonne, IL

8:15 Chairman of the Denver X-ray Conference Opening Remarks

Robert L. Snyder, Georgia Institute of Technology, Atlanta, GA

PRESENTATION OF AWARDS

2010 Birks Award

Presented to **Victor Buhrke**, Consultant, Portola Valley, CA

Presented by **Tim Elam**, Ametek/EDAX Research Group and the University of Washington APL, Seattle, WA

2010 Jerome B. Cohen Award (winner announced at the Plenary Session)

Presented by **Cev Noyan**, Columbia University, New York, NY

PLENARY SESSION REMARKS BY THE CHAIRS

8:30 D-52 Investigations of the Defect Structure of Transparent Conductors Using X-ray and Neutron Scattering Techniques

Gabriela B. González Avilés, DePaul University, Chicago, IL

T.O. Mason, **J.S. Okasinski**, **O. Warschkow**, **D.E. Ellis**, Northwestern University, Evanston, IL

J.P. Hodges, Oak Ridge National Laboratory, Oak Ridge, TN

T. Buslaps, **V. Honkimäki**, European Synchrotron Radiation Facility, Grenoble, France

9:15 D-76 Insights into Thermoelectric Materials: New Structures and Properties

Paul Zschack, Argonne National Laboratory, Argonne, IL

C. Heideman, **Q. Lin**, **N. Nguyen**, **M. Smeller**, **C. Mortensen**, **D.C. Johnson**, University of Oregon, Eugene, OR

10:00 Break

10:30 D-35 In-Situ Diffraction: An Important Tool for the Development of Renewable Energy Technologies

Mark A. Rodriguez, Sandia National Laboratories, Albuquerque, NM

11:15 D-91 Unraveling the Inner Workings of Energy-Related Materials Using In-Situ X-ray Absorption Techniques

Faisal M. Alamgir, Georgia Institute of Technology, Atlanta, GA

12:00 F-36 FP-Based EDXRF Characterization of Thin Film Solar Cells

Volker Röbiger, **J. Kessler**, Helmut Fischer GmbH, Sindelfingen, Germany

M. Haller, Fischer Technology, Inc., Windsor, CT

XRD AND XRF

NEW DEVELOPMENTS IN XRD & XRF INSTRUMENTATION

EVERGREEN C

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

- 1:00 C-2 The Latest Development of Microfocusing Source Based Beam Modules and Their Applications**
B. Kim, B. Verman, D. Wilcox, R. Samokyszyn, M. Young, L. Jiang, Rigaku Innovative Technologies, Inc., Auburn Hills, MI
- 1:15 D-5 A New Geometry for 21st Century Diffraction**
K.D. Rogers, J. Rogers, A. Dicken, Cranfield University, Cranfield, Bedfordshire, UK
P. Evans, J.W. Chan, X. Wang, Nottingham Trent University, Nottingham, UK
- 1:30 D-15 A New Approach to High Throughput Diffraction Analysis**
S. Roncallo, S.A. Ansari, D.W. Lane, Cranfield University, Shrivenham, Swindon, Wiltshire, UK
O. Karimi, K.D. Rogers, Cranfield University, Cranfield, Bedfordshire, UK
J.M. Gregoire, Cornell University, Ithaca, NY
- 1:45 D-24 Design and Development of Compound X-ray Optical Systems**
B. Verman, D. Wilcox, B. Kim, R. Samokyszyn, M. Young, Y. Hua, L. Jiang, Rigaku Innovative Technologies, Inc., Auburn Hills, MI
T. Ozawa, R. Matsuo, K. Omote, T. Osakabe, M. Aoyagi, K. Sumii, Rigaku Cooperation, Tokyo, Japan
- 2:00 D-44 X-ray Source, Optic and Detector for Two-Dimensional XRD**
B.B. He, Bruker AXS, Madison, WI
- 2:15 D-45 Development of In Situ X-ray Diffraction System for Hydrothermal Reaction and Its Application to Autoclaved Aerated Concrete Formation**
J. Kikuma, M. Tsunashima, T. Ishikawa, S. Matsuno, Asahi-KASEI Corporation, Fuji, Shizuoka, Japan
K. Matsui, A. Ogawa, Asahi-KASEI Construction Materials Corporation, Sakai, Ibaraki, Japan
- 2:30 D-61 New Instrumentation for X-ray Material Research**
H.R. Ress, B.B. He, B. Jones, Bruker AXS, Madison, WI
G. Vanhoyland, Bruker AXS, Karlsruhe, Germany
- 2:45 D-62 Clever Diffractometers with the Incoatec Microfocus Source**
T. Samtleben, C. Michaelsen, B. Hasse, J. Graf, J. Wiesmann, Incoatec GmbH, Geesthacht, Germany
- 3:00 D-66 High Brilliance Microfocus Sources with Scatterless Collimation for Improved SAXS**
S. Rodrigues, P. Panine, V. Roger, P. Høghøj, Xenocs, Sassenage, France
- 3:15 Break**
- 3:45 D-86 Empyrean—The World of X-ray Diffraction Is No Longer Flat**
M. Fransen, PANalytical, Almelo, The Netherlands
- 4:00 F-9 Combined X-ray Imaging and Spectroscopy—A Low Cost Solution**
D. Lane, J. Lyons, Cranfield University, Shrivenham, Swindon, UK
- 4:15 F-10 High Speed 2D and 3D MXRF—Imaging with Bench Top Technology**
U. Waldschlaeger, M. Haschke, Bruker Nano GmbH, Berlin, Germany

4:30 F-16 Readout ASICs for Silicon Drift Detectors

L. Bombelli, C. Fiorini, A. Celani, A. Longoni, *Politecnico di Milano - DEI - , Milano, Italy*
R. Alberti, T. Frizzi, R. Nava, *XGLab S.R.L., Milano, Italy*

4:45 F-51 Bruker EDXRF New Product Releases and News 2010

A. Seyfarth, *Bruker AXS Inc., Madison, WI*
A. Gross, *Bruker AXS Microanalysis, Berlin, Germany*
J. Patterson, B. Kaiser, *Bruker Elemental, Inc., Kennewick, WA*

5:00 F-57 Excellent Performance with 100 mm² Silicon Drift Detectors for X-rays and Gamma Radiation

A. Niculae, A. Liebel, A. Simsek, O. Jaritschin, *PNDetector GmbH, Munich, Germany*
H. Soltau, A. Liebel, R. Eckhardt, G. Lutz, S. Jeschke, P. Lechner, *PNSensor GmbH, Munich, Germany*
L. Strüder, F. Schopper, G. Schaller, *MPI Semiconductor Laboratory, Munich, Germany*
C. Fiorini, *Politecnico di Milano, Milano, Italy*

5:15 F-70 Ultrathin Multi-Element Layer Stacks – A New Type of Reference Samples for μ -XRF and TXRF

M. Kraemer, T. Holz, R. Dietsch, D. Weissbach, *AXO Dresden GmbH, Heidenau, Germany*
G. Falkenberg, *Hasylab at DESY, Hamburg, Germany*
R. Simon, *FZ Karlsruhe, Eggenstein, Germany*
U. Fittschen, T. Krugmann, *Universität Hamburg, Hamburg, Germany*
B. Beckhoff, *PTB Berlin, Berlin, Germany*

5:30 F-73 High-Definition XRF – Multiple Monochromatic Beams EDXRF – For Consumer Product Analysis

Z.W. Chen, S. Nayar, *X-ray Optical Systems, Inc., East Greenbush, NY*

XRD

POLYMERS/SAXS (SUPPORTED BY BRUKER, PANALYTICAL AND RIGAKU)

EVERGREEN A

Chairs: S. Murthy, *Rutgers University, Piscataway, NJ*

B. Landes, *Dow Chemical Company, Midland, MI*

1:30 D-94 Invited—In-Situ and Time Resolved Small-Angle X-ray Scattering

B.G. Landes, B.J. Kern, T.J. Hermel-Davidock, M. Demirors, J.D. Weinhold, G.R. Marchand, K. Nanjundiah,
R.E. Drumright, *The Dow Chemical Company, Midland, MI*
S.J. Weigand, *Northwestern University, DND-CAT, Chicago, IL*

2:00 D-84 Invited—The Structure and Hydrogen Bonding of a Highly Disordered Fiber

J.D. Londono, A.D. English, *DuPont Company, Wilmington, DE*
P. Langan, *Los Alamos National Laboratory, Los Alamos, NM*
Y. Nishiyama, *CNRS, Grenoble, France*
T. Forsyth, *ILL/Keele University, Staffordshire, UK*

2:30 D-29 Investigation of Microstructural Changes in Impacted Polyurea Coatings Using Small-Angle X-ray Scattering (SAXS)

E. Balizer, J. Fedderly, G. Lee, *NSWCCD, Bethesda, MD*
S. Bartyczak, W. Mock, *NSWCCD, Dahlgren, VA*

3:00 Break

WEDNESDAY PM—EVERGREEN A

**3:20 D-53 *Invited*—Analysis of the Equatorial Streak in Small-Angle X-ray Scattering Patterns:
Investigation of Deformation in Carbon Nanotube-Reinforced Polyacrylonitrile Fibers**

N.S. Murthy, *Rutgers University, Piscataway, NJ*

W. Wang, *University of Vermont, Burlington, VT*

**3:50 D-68 *Invited*—Transient Microstructure of Thermoplastic Polyurethane Nanocomposites Under
Uniaxial Deformation**

H. Koerner, R. Vaia, *Air Force Research Lab, WPAFB, OH*

4:20 D-75 Preferred Orientation in Polymer Fibers

C. Burger, B.S. Hsiao, B. Chu, *Stony Brook University, Stony Brook, NY*

4:40 D-11 Polymer-Oriented Tools in the *Irena* Package for Small-Angle Scattering Data Analysis

J. Ilavsky, *APS- Argonne National Laboratory, Argonne, IL*

**5:00 D-99 Relaxation Behaviors of Nanoparticles in Polymer Composites: Influence of Local Frictions
by Polymer Chains**

B. Lee, P. Thiyagarajan, S. Narayanan, A. Sandy, C.-T. Lo, V. Pol, D. Bohnsack, *Argonne National Laboratory, Argonne, IL*

WEDNESDAY PM

XRD

HANAWALT AWARD SESSION

NANOSTRUCTURE STUDIES USING THE ATOMIC PAIR DISTRIBUTION FUNCTION

Chair: E. Bozin, *Brookhaven National Laboratory, Upton, NY*

EVERGREEN D

All presentations are invited

1:20 Presentation of the 2010 Hanawalt Award

*Presented to Takeshi Egami, University of Tennessee, Knoxville, TN and
Simon Billinge, Columbia University, New York, NY*

Presented by Robert L. Snyder, Chairman of the Denver X-ray Conference

1:30 D-87 Recent Advances in the PDF Technique (2)

T. Egami, *University of Tennessee, Knoxville, TN*

**2:15 D-100 Structure at the Nanoscale: Atomic Pair Distribution Function Analysis of Nanostructured
Materials**

S. Billinge, *Columbia University, New York, NY*

3:00 Break

3:30 D-92 Structure of Crystallographically Challenged Hydrogen Storage Materials

H.J. Kim, *Los Alamos National Laboratory, Los Alamos, NM*

3:55 D-97 PDF Analysis of Glassy and Nanocrystalline Metallic Materials

W. Dmowski, Y. Iwashita, T. Egami, *University of Tennessee, Knoxville, TN*

S.H. Overbury, *ORNL, Oak Ridge, TN*

WEDNESDAY PM—EVERGREEN D

4:20 D-89 Force Measurement of DNA with Pair Distribution Function

X. Qiu, *National Institutes of Health, Bethesda, MD*

4:45 D-83 Element-Specific Structure of Nanosized Materials by High-Energy Resonant X-ray Diffraction and Differential Atomic Pair Distribution Functions

V. Petkov, *Central Michigan University, Mt. Pleasant, MI*

S. Shastri, *APS- Argonne National Laboratory, Argonne, IL*

5:10 D-98 Progress with the GSAS-II Software Package for Crystallography

B.H. Toby, R.B. Von Dreele, *APS - Argonne National Lab, Argonne, IL*

WEDNESDAY PM

XRF

FUSION AND INDUSTRIAL APPLICATIONS OF XRF

EVERGREEN B

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

2:00 F-1 *Invited*—Applications of X-ray Fluorescence in the Titanium Dioxide Industry

L. Ottmar, *Millennium Inorganic Chemicals, Glen Burnie, MD*

2:30 F-27 Global Cement and Raw Materials Fusion/XRF Analytical Solution: Part 2

M. Bouchard, J. Anzelmo, S. Rivard, *Corporation Scientifique Claisse, Quebec, Canada*

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

K. Behrens, S. Durali-Müller, *Bruker-AXS GmbH, Karlsruhe, Germany*

2:50 F-24 Advancing Photovoltaics: New Methods for the Determination of Czts Stoichiometry

W. Brubaker, *DuPont Central Research and Development, Wilmington, DE*

3:10 Break

3:40 F-23 *Invited*—Applications of XRF in CRM Development at the National Institute of Standards and Technology

J.R. Sieber, *NIST, Gaithersburg, MD*

4:10 F-2 Certifying Lead Content in Child-Accessible Products, a New Generation of Calibration and Certified Reference Materials

J.B. Sardisco, K.A. Perrin, J.S. Crnko, *Analytical Services, Inc., The Woodlands, TX*

4:30 F-14 Waste Reduction Process Improvements in the Analysis of Plutonium by X-ray Fluorescence: Results from Multiple Data Sets

C.G. Worley, C.B. Soderberg, L.E. Townsend, *Los Alamos National Laboratory, Los Alamos, NM*

4:50 F-8 Combining CdTe and Si Detectors for Energy-Dispersive X-ray Fluorescence

R. Redus, T. Pantazis, J. Pantazis, A. Huber, *Amptek, Inc., Bedford, MA*

B. Cross, *CrossRoads Scientific, El Granada, CA*

THURSDAY AM

XRD

RIETVELD ANALYSIS I

EVERGREEN C

Chairs: J. Kaduk, Poly Crystallography Inc., Naperville, IL

S.T. Misture, NYS College of Ceramics at Alfred University, Alfred, NY

9:00 D-54 Invited—Synchrotron Powder X-ray Diffraction Study of the Structure and Dehydration Behaviors of Sepiolite and Palygorskite

J.E. Post, Smithsonian Institution, Washington, DC

P.J. Heaney, Pennsylvania State University, University Park, PA

9:30 D-58 Invited—Applications of Time-Resolved Synchrotron X-ray Diffraction to Mineral-Fluid Reactions

P.J. Heaney, T.B. Fischer, C.R. Fleeger, D.R. Hummer, K.M. Peterson, A.J. Wall, Penn State University, University Park, PA

J.E. Post, Smithsonian Institution, Washington, DC

10:00 D-14 Synthesis and Characterization of Ettringites

H. Poellmann, University of Halle, Halle, Germany

10:20 D-33 Oxygen Octahedral Environments in Three-Layer Aurivillius Phases via Combined X-ray and Neutron Powder Diffraction

E.J. Nichols, S.T. Misture, Alfred University, Alfred, NY

10:40 Break

11:10 D-95 Bond Length Evolution in 312 and 211 Max Phases from High Temperature Neutron Diffraction and Rietveld Analysis

N.J. Lane, M.W. Barsoum, Drexel University, Philadelphia, PA

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

11:30 D-12 Quantifying the Extent to which Experimental Pole Intensity Data Determine an Orientation Density Function Explaining the Data

R. Hielscher, Technische Universitaet Chemnitz, Germany

H. Schaeben, Technische Universitaet Bergakademie Freiberg, Germany

THURSDAY AM

XRF

ENVIRONMENTAL AND HANDHELD XRF

EVERGREEN B

Chairs: J.A. Anzelmo, Anzelmo & Associates, Inc., Madison, WI

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

8:30 Invited—Title to be announced

J. Gearheart, Ecology Center, Ann Arbor, MI

9:00 F-32 Invited—Assessing the Environment with X-ray Fluorescence

J. Boman, J.B.C. Pettersson, University of Gothenburg, Gothenburg, Sweden

M. Gatari, University of Nairobi, Nairobi, Kenya

A. Wagner, Chalmers University of Technology, Gothenburg, Sweden

P. Molnár, Sahlgrenska University Hospital & University of Gothenburg, Gothenburg, Sweden

THURSDAY AM—EVERGREEN B

9:30 F-47 **Invited—X-ray Fluorescence Spectrometry in the Environmental Field: A Review of Some Recent Investigations and Applications**

E. Margui, I. Queralt, *Institute of Earth Sciences “Jaume Almera”, CSIC, Barcelona, Spain*

M. Hidalgo, *University of Girona, Girona, Spain*

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

10:00 F-7 **Characterization of Silicon Drift Detectors for EDXRF**

R. Redus, T. Pantazis, J. Pantazis, A. Huber, *Amptek, Inc., Bedford, MA*

10:20 **Break**

10:50 F-39 **Invited—Micro-XRF Analysis of Metal Alloys: From the Laboratory Calibration Towards In-Situ Analyses**

A.G. Karydas, V. Kantarelou, D. Sokaras, *Institute of Nuclear Physics, NCSR Demokritos, Athens, Greece*

D. Wegrzynek, E-Chinea-Cano, A. Markowicz, *International Atomic Energy Agency (IAEA), Seibersdorf, Austria*

P. Wobrauschek, C. Streli, *TU Wien Atominstitut, Vienna, Austria*

K. Uhlir, M. Griesser, *Kunsthistorisches Museum, Wien, Austria*

11:20 F-55 **Indoor Air Quality in Brazilian Schools Nearby Industries: The Case of Curitiba**

R.H.M. Godoi, A.F.L. Godoi, M.G. Arantes, S.J. Gonçalves Jr, L.C. Stroppa, R. Alves, J.E. Ferreira da Costa Gardolinski, J. Manoel dos Reis Neto, *Federal University of Parana - UFPR, Curitiba – PR, Brazil*

E.M. Fortunato de Lucena Reynaldo, *Red Cross Hospital – Paraná, Curitiba, Brazil*

B. Alfody, *KFKI Atomic Energy Research Institute, Budapest, Hungary*

Y. Makarovska, R. Van Grieken, *University of Antwerp, Antwerp, Belgium*

11:40 F-60 **XRS for Preventive Conservation of Cultural Heritage**

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

THURSDAY AM

XRF

QUANTITATIVE ANALYSIS

EVERGREEN D

Chair: T. Elam, Ametek/EDAX Research Group and Univ. of Washington APL, Seattle, WA

8:30 F-18 **Invited—Analytical Strategy for Compositional and Layer Thickness Analysis of Copper-Indium-Gallium-Selenium on Molybdenum Coated Glass Substrates**

L.L. Brehm, T.T. Hasan, D.A. Libby, T.R. Bryden, *The Dow Chemical Company, Midland, MI*

9:00 C-4 **XANES Based Quantitative Phase Analysis in $\text{Cu}_2\text{ZnSnS}_4$**

H.D. Rosenfeld, *E.I. DuPont de Nemours & Co., Wilmington, DE*

9:20 F-4 **Quantification of Two-Polymeric Phases in Paint Formulation by X-ray Fluorescence and X-ray Photoelectron Spectroscopy**

P. Ricou, R. Gupta, *Arkema Inc., King of Prussia, PA*

9:40 F-11 **Glancing Versus Normal XRF Excitation with Monochromatic and Polychromatic Radiation for the Composition Analysis of SmCo Based Films on Silicon Wafers**

F.J. Cadieu, I. Vander, R.W. Zuneska, *Queens College of CUNY, Flushing, NY*

THURSDAY AM—EVERGREEN D

10:00 F-61 Depth-Resolved Speciation of Buried Nanolayers

B. Pollakowski, B. Beckhoff, *Physikalisch-Technische Bundesanstalt, Berlin, Germany*

10:20 Break

10:40 F-66 Investigation of Spin-Coated Inorganic Contamination on Si Surfaces by Various Analytical Techniques

B. Beckhoff, M. Kolbe, M. Müller, *Physikalisch Technische Bundesanstalt, Berlin, Germany*

A. Nutsch, R. Altmann, *Fraunhofer IISB, Erlangen, Germany*

G. Borionetti, C. Pello, *MEMC Electronic Materials SpA, Novara, Italy*

M.L. Polignano, D. Codegoni, S. Grasso, E. Cazzini, *Numonyx, Via Olivetti, Milan, Italy*

M. Bersani, P. Lazzeri, S. Gennaro, *Fondazione Bruno Kessler, Trento, Italy*

P. Kregsamer, F. Posch, *Atominstitut, TU Wien, Vienna, Austria*

11:00 F-41 X-ray Fluorescence Analysis of Palladium in Non-Homogeneous Organics and Slurries via Gel Suspensions

D.W. Burns, Y. Yang, *Dow Chemical, Freeport, TX*

S. Yusuf, *Dow Chemical, Midland, MI*

D.G. Coler, *PANalytical, Westborough, MA*

11:20 F-13 Advantages and Disadvantages of Bayesian Methods for Obtaining XRF Net Intensities

W.T. Elam, B. Scruggs, F. Eggert, J. Nicolosi, *EDAX, a unit of Ametek Inc., Mahwah, NJ*

11:40 F-54 Development of Quantification Method Using Fundamental Parameter Method for EDXRF

S. Hara, N. Kawahara, T. Matsuo, M. Doi, *Rigaku Corporation, Osaka, Japan*

12:00 F-59 Characterization of Gemstones by Multiple Excitation EDXRF

M. Haller, *Fischer Technology, Windsor, CT*

V. Rößiger, *Helmut Fischer GmbH, Sindelfingen, Germany*

A. Peretti, *Gemresearch Swisslab AG, Lucerne, Switzerland*

D. Günther, *ETH Zürich, Switzerland*

THURSDAY PM

XRD & XRF

CULTURAL HERITAGE I (SUPPORTED BY BRUKER)

EVERGREEN A

Chairs: M. Walton, *Getty Conservation Institute, Los Angeles, CA*

K. Eremin, *Harvard Art Museum, Cambridge, MA*

2:00 F-19 *Invited*—Analysis of Meissen Ceramics from the Hoffmeister Collection by HH-XRF

A.J. Shortland, K. Domoney, *Cranfield University, Swindon, UK*

S. Kuhn, *Bonham's Auctioneers, London, UK*

2:30 C-8 *Invited*—Analyzing Stratigraphy with a Dual XRD/ XRF Instrument

G. Chiari, *Getty Conservation Institute, Los Angeles, CA*

3:00 D-3 An Archaeologist's Dilemma

K.D. Rogers, S. Beckett, S. Kuhn, *Cranfield University, Swindon, Wiltshire, UK*

A. Chamberlain, *Sheffield University, Sheffield, UK*

J. Clement, *University of Melbourne, Melbourne, Australia*

3:20 Break

3:50 F-50 **Invited—Incorporating the Concept of Secondary Targets in Handheld X-ray Fluorescence to Increase Sensitivity of Minor Elements**

C. McGlinchey, *The Museum of Modern Art, NY, NY*

B. Kaiser, T. Howe, *Bruker Elemental, Kennewick, WA*

4:20 F-79 **Characterization of Silver Gelatin Fiber Based Photographic Papers using X-ray Fluorescence Spectroscopy**

A. Martins, C. McGlinchey, L.A. Daffner, *Museum of Modern Art, New York, NY*

P. Messier, *LLC, Boston, MA*

A. Chapman, *University of Delaware Program in Art Conservation, Winterthur, DE*

THURSDAY PM

XRD

RIETVELD ANALYSIS II

EVERGREEN C

Chairs: J. Kaduk, Poly Crystallography Inc., Naperville, IL

S.T. Misture, NYS College of Ceramics at Alfred University, Alfred, NY

2:00 D-74 **Invited—High-Resolution Powder X-ray Diffraction Study of Complex Minerals**

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

2:30 D-22 **Crystal Structures of $\text{BaSrR}_4\text{Zn}_2\text{O}_{10}$, R = La, Nd, Sm, Eu**

J.A. Kaduk, *Poly Crystallography, Naperville, IL*

W. Wong-Ng, *NIST, Gaithersburg, MD*

2:50 D-60 **Detection and Quantification of Passivation Layers in Electrochemical Inert Anodes by In-Situ and Ex-Situ Diffraction**

M.R. Rowles, K. McGregor, G.A. Snook, *CSIRO Process Science and Engineering/CSIRO Light Metals Flagship, Victoria, Australia*

I.C. Madsen, N.V.Y. Scarlett, M. Lanyon, A. Urban, *CSIRO Process Science and Engineering, Victoria, Australia*

M.J. Styles, D.P. Riley, *The University of Melbourne, Victoria, Australia*

3:10 Break

3:40 C-6 **Characterization of X-ray Powder Diffraction Data of $\text{Ba}_x\text{Sr}_{1-x}\text{SO}_4$ ($0 \leq x \leq 1$) by Rietveld Refinement**

S.R. Zaidi, H. Sitepu, S. Shen, N. Al-Yami, *Saudi ARAMCO, Dhahran, Saudi Arabia*

4:00 D-77 **XRD Anisotropic Broadening of Nano-Particles**

Y. Wang, S.L.I. Chan, Y.R. Shen, R. Amal, K. Kiatkittipong, *University of New South Wales, Australia*

4:20 D-19 **Differences between Near-Surface and Bulk Preferred Orientation with Powder Diffraction Data of Molybdenite (MoO_3) and Calcite (CaCO_3)**

H. Sitepu, *Curtin University of Technology, Perth, Australia and Saudi ARAMCO, Dhahran, Saudi Arabia*

B.H. O'Connor, D. Li, *Curtin University of Technology, Perth, Australia*

4:40 D-13 **Computational Texture Analysis with MTEX**

R. Hielscher, *Technische Universität Chemnitz, Germany*

F. Bachmann, H. Schaeßen, *Technische Universität Bergakademie Freiberg, Germany*

THURSDAY PM

XRD

MICRO DIFFRACTION

EVERGREEN D

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

2:00 D-20 Invited—Three Dimensional X-ray Diffraction Microscopy

L. Margulies, Brookhaven National Laboratory, Upton, NY

H.F. Poulsen, S. Schmidt, D.J. Jensen, Risoe National Lab, Roskilde, Denmark

G. Vaughan, J. Wright, ESRF, Grenoble, France

2:30 D-30 Invited—Nanoscale Scanning Probe Diffraction Microscopy at the Hard X-ray Nanoprobe Beamline

M. Holt, S. Hruszkewycz, R. Winarski, V. Rose, J. Maser, Argonne National Laboratory, Argonne, IL

3:00 D-81 Multi-Dimensional X-ray Investigation of Materials—Ranging from Classical Bragg-Brentano Type Diffraction Phase Analysis to 3 Dimensional CT Microstructure Analysis

H. Pöllmann, University of Halle/Mineralogy, Halle, Germany

R. Maier, U. Riedl, G. Blaj, PANalytical, Almelo, The Netherlands

THURSDAY PM

XRD

MILE HIGH RESOLUTION XRD

EVERGREEN D

Chair: K. Evans-Lutterodt, Brookhaven National Laboratory, Upton, NY

3:50 D-73 High Resolution X-ray Diffraction of III-Nitride Wide Bandgap Semiconductors

Q. Sun, B. Leung, J. Han, Yale University, New Haven, CT

4:10 D-17 High-Resolution Reciprocal Space Mapping of InGaAs/GaAs Structures: From Pseudomorphic to Fully Relaxed State

A. Ulyanenko, Bruker AXS GmbH, Karlsruhe, Germany

F. Rinaldi, S. Menzel, Ulm University, Ulm, Germany

A. Benediktovich, A. Zhilik, I. Feranchuk, Belarussian State University, Minsk, Belarus

K. Saito, Bruker AXS K.K., Yokohama, Japan

4:30 D-36 In-Plane Diffraction Analysis for Twist/Twin Structure of Non-Polar A-Plane GaN

Y.-i. Jang, K.-h. Park, K.-h. Bang, LG Advanced Research Institute, Seoul, Korea

4:50 D-1 Effect of Substrate Temperature on the Structural, Optical and Electrical Properties of Silver Indium Selenide Films Prepared by Laser Ablation

D. Pathak, R.K. Bedi, Guru Nanak Dev University, Amritsar, India

D. Kaur, Indian Institute of Technology, Roorkee, India

THURSDAY PM

XRF

X-RAY IMAGING

EVERGREEN B

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

- 2:00 F-22 *Invited*—X-ray Absorption Imaging for Analysis of Gas Discharges in Energy-Efficient Lighting**
J.J. Curry, NIST, Gaithersburg, MD
- 2:30 F-3 STXM Imaging of Organic Coatings on Grains in Primitive Interplanetary Dust: Implications for Formation of Pre-Biotic Organic Matter and Grain Sticking in the Early Solar System**
G.J. Flynn, SUNY-Plattsburgh, Plattsburgh, NY
S. Wirick, C. Jacobsen, SUNY- Stony Brook, Stony Brook, NY
L.P. Keller, NASA Johnson Space Center, Houston, TX
S.A. Sandford, NASA Ames Research Center, Moffett Field, CA
- 2:50 F-37 Macroscopic X-ray Fluorescence Capability for Large-Scale Elemental Mapping**
H.M. Volz, G.J. Havrilla, R.M. Aikin, Jr., V.M. Montoya, A.N. Duffield, Los Alamos National Laboratory, Los Alamos, NM
- 3:10 F-29 Overlay of Laboratory-Based 3D X-ray Imaging Systems**
B.M. Patterson, G.J. Havrilla, B. Jackson, Los Alamos National Laboratory, Los Alamos, NM
- 3:30 Break**
- 4:00 F-26 *Invited*—X-ray Chemical Imaging in Scanning and Projection Modes in the Laboratory**
K. Tsuji, K. Nakano, Osaka City University, Osaka, Japan
- 4:30 D-28 High Speed 3D Diffraction Imaging**
J.P.O. Evan, J.W. Chan, S.X. Godber, I. Peatfield, Nottingham Trent University, Nottingham, UK
K.D. Rogers, A. Dicken, J. Rogers, Cranfield University, Cranfield, Bedfordshire, UK
- 4:50 F-34 Selecting the Appropriate X-ray Optic for the Right Application**
G.J. Havrilla, V. Montoya, Los Alamos National Laboratory, Los Alamos, NM

FRIDAY AM

XRD & XRF

CULTURAL HERITAGE II

EVERGREEN A

Chairs: M. Walton, Getty Conservation Institute, Los Angeles, CA

K. Eremin, Harvard Art Museum, Cambridge, MA

- 8:30 C-10 *Invited*—Going Beyond XRF: Use of Micro-Fluorescence and Diffraction to Understand How a Cultural Heritage Object Was Made and How It Ages and Degrades**
M. Walton, Getty Conservation Institute, Los Angeles, CA
E.J. Schofield, University of Kent, Canterbury, UK
R. Sarangi, S. Webb, A. Mehta, SSRL/SLAC Nat Accd. Lab, Menlo Park, CA
F. Meirer, Technische Universität Wien, Vienna, Austria
- 9:00 F-28 XRF Line and Area Scans in the Examination of Works of Art**
K. Trentelman, Getty Conservation Institute, Los Angeles, CA

FRIDAY AM—EVERGREEN A

- 9:20 F-38 The Challenges of XRF Analysis of Cultural Heritage Glass Objects**
B.J. Kaiser, *Bruker Elemental, Kennewick, WA*
R. Brill, *Corning Glass Museum, Corning, NY*
- 9:40 F-12 Glancing Incidence XRF for the Analysis of Early Chinese Bronze Mirrors**
R.W. Zuneska, J. Rong, I. Vander, F.J. Cadieu, *Queens College of CUNY, Flushing, NY*
- 10:00 Break**
- 10:20 F-17 *Invited*—The Photo-Oxidative Degradation of Matisse's *Le Bonheur De Vivre* (1905-6): X-ray-Based Methods for Degradation Mechanism Identification**
J.L. Mass, *Winterthur Museum, Winterthur, DE*
B. Buckley, M. Little, *The Barnes Foundation, Merion, PA*
- 10:50 F-68 Visualizing the 17th Century Underpainting Using Mobile and Synchrotron-Based Scanning Macro-XRF**
M. Alfeld, K. Janssens, *University of Antwerp, Antwerp, Belgium*
J. Dik, *Delft University of Technology, Delft, The Netherlands*
P.D. Siddons, *Brookhaven National Laboratory, NSLS, Brookhaven, NY*
E. van de Wetering, *Rembrandt Research Project, Amsterdam, The Netherlands*
- 11:10 C-9 Medieval Microfabrication: X-ray Tomographic and Laminographic Visualization of Religious Artwork**
J. Dik, J. Blaas, *Delft University of Technology, Delft, The Netherlands*
A. Wallert, *Rijksmuseum, Amsterdam, The Netherlands*
P. Reischig, L. Helfen, A. Bravin, *European Synchrotron Radiation Facility, Grenoble, France*

FRIDAY AM

XRD

STRESS ANALYSIS

EVERGREEN B

Chairs: C. Goldsmith, IBM, Hopewell Junction, NY
T. Watkins, Oak Ridge National Laboratory, Oak Ridge, TN

- 8:30 D-50 *Invited*—Thermo-Mechanical Behavior of Thin Films and Small Structures Characterized by Synchrotron X-ray Diffraction**
J. Keckes, *University Leoben and Austrian Academy of Sciences, Leoben, Austria*
- 9:00 D-48 XRD Stress Analyses on Surfaces with Curvature Radius below 1mm, a New Challenge!**
A. Haase, M. Klatt, A. Schafmeister, R. Stabenow, *GE Sensing & Inspection Technologies GmbH, Ahrensburg, Germany*
- 9:20 D-101 *Invited*—A Next Generation Neutron Diffraction Strain Scanner for Steady-State Sources**
R.B. Rogge, *Canadian Neutron Beam Centre, National Research Council, Canada*
- 9:50 Break**
- 10:10 D-16 *Invited*—Commissioning Results and New Scientific Opportunities at Vulcan—The SNS Materials Science and Engineering Diffractometer**
K. An, X.-L. Wang, A.D. Stoica, H. Skorpenske, D. Ma, C.R. Hubbard, *Oak Ridge National Laboratory, Oak Ridge, TN*
T.M. Holden, *Northern Stress Technology, Deep River, Canada*
P.K. Liaw, H. Choo, *University of Tennessee, Knoxville, TN*

FRIDAY AM—EVERGREEN B

10:40 D-96 In-Situ Neutron Diffraction Study of Residual Stress in Steel Ammonia Nurse Tank Welds

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

A. Russel, *Ames National Laboratory, Ames, IA*

S. Chumbley, A. Becker, *Iowa State University, Ames, IA*

FRIDAY AM

XRF

TRACE ANALYSIS

EVERGREEN C

Chair: **P. Wobrauschek**, *Atominstitut, Vienna University of Technology, Vienna, Austria*

8:30 F-72 *Invited*—TXRF- A Versatile Tool for Trace Element Analysis: A Review

P. Wobrauschek, *Atominstitut, Vienna Univ. of Technology, Vienna, Austria*

9:00 F-31 Discovering the Selenium Metabolism and Its Impact for Health Prevention by TXRF

A. Gross, H. Stosnach, *Bruker Nano GmbH, Berlin, Germany*

K. Renko, T. Behrends, L. Schomburg, *Charité Berlin, Berlin, Germany*

9:20 F-76 *Invited*—Different Applications of Polycapillaries to X-ray Spectroscopy

H.J. Sánchez, R.D. Pérez, *Universidad Nacional de Córdoba, Argentina*

C.A. Pérez, *Laboratório Nacional de Luz Síncrotron, Campinas, Brasil*

9:50 F-33 Trace Element Detection Using Monochromatic Wavelength Dispersive X-ray Fluorescence

G.J. Havrilla, M. Collins, V. Montoya, *Los Alamos National Laboratory, Los Alamos, NM*

Z. Chen, F. Wei, *X-ray Optical Systems, East Greenbush, NY*

10:10 Break

10:30 F-74 *Invited*—Analysis of Indoor Fine Dust

U.E.A. Fittschen, A. Rehmers, *University of Hamburg, Hamburg, Germany*

M. Santen, *Greenpeace Hamburg, Hamburg, Germany*

M. Wesselmann, *Bauinstitut Hamburg, Hamburg, Germany*

11:00 F-62 Characterization of Nanoparticles with X-ray Spectrometry under Grazing Incidence Conditions

F. Reinhardt, B. Beckhoff, B. Pollakowski, *Physikalisch-Technische Bundesanstalt, Berlin, Germany*

H. Bresch, S. Seeger, *Bundesanstalt für Materialforschung und –prüfung, Berlin, Germany*

11:20 F-65 Assessment of Advanced X-ray GIXRF Methodology Applied to the Characterization of Ultra Shallow Junctions

P. Hönicke, B. Beckhoff, M. Kolbe, *Physikalisch-Technische Bundesanstalt, Berlin, Germany*

D. Giuberton, G. Pepponi, *Fondazione Bruno Kessler, Trento, Italy*

J. van den Berg, *University of Salford, Salford, UK*

11:40 F-49 Comparison of X-ray and Mass Spectroscopy Based Analytical Methods for Detection of Organic Contamination

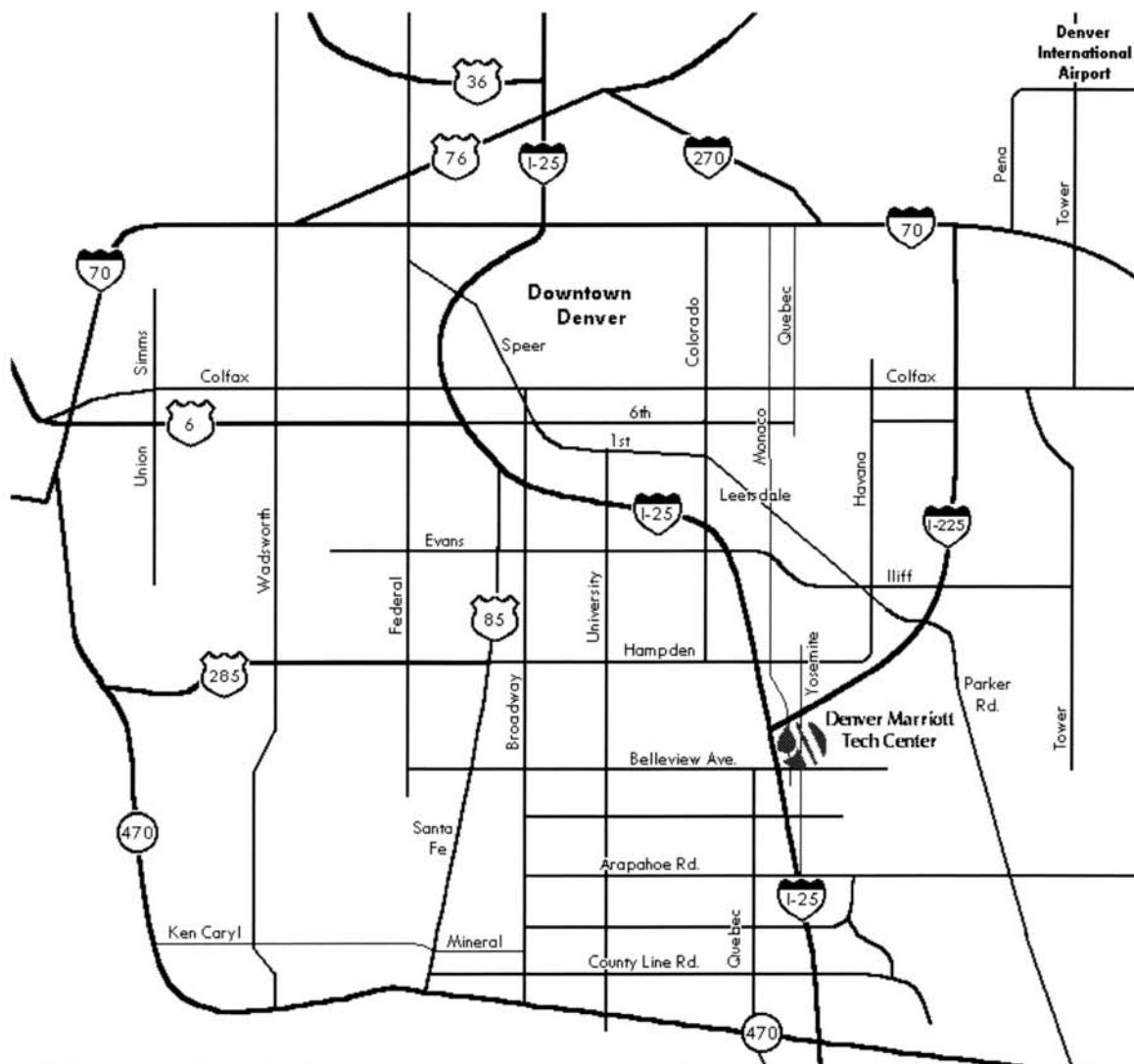
A. Nutsch, A. Leibold, L. Pfitzner, M. Otto, *Fraunhofer IISB, Erlangen, Germany*

B. Beckhoff, M. Müller, *Physikalisch-Technische Bundesanstalt, Berlin, Germany*

G. Bedana, G. Borionetti, G. Guerinoni, *MEMC Electronic Materials SpA, Novara, Italy*

M.-L. Polignano, D. Codegoni, S. Grasso, D. De Simone, *Numonyx, Milan, Italy*

DIRECTIONS & AREA MAP



DENVER **Marriott.** TECH CENTER

**4900 S. Syracuse Street
Denver, CO 80237**

(303) 779-1100

Directions from DIA Airport

Pena Blvd. to I-70 West
I-70 to I-225 South
I-225 to Yosemite (Exit 2)
Yosemite (west along frontage rd.) to DTC Blvd.
Left on DTC Blvd.
Right on Union Ave.
Left on Syracuse St.
Hotel is on right

LOCAL ATTRACTIONS

Local Attractions*

Museums

Denver Art Museum, (303) 640-2793
Museum of Western Art, (303) 296-1880
Denver Museum of Natural History, (303) 322-7009
IMAX Theater, (303) 370-6300
Gates Planetarium, (303) 370-6351
Molly Brown House Museum, (303) 832-4092

Performing Arts

Denver Center for the Performing Arts, (303) 893-3272
Center Attractions, (303) 893-4100
Denver Center Theater Company, (303) 893-4000
Symphony Orchestra (Boettcher Concert Hall), (303) 592-7777
Temple Buell Theater, (303) 640-2862
Opera Colorado, (303) 778-6464
Paramount Theater, (303) 534-8336

Other Area Attractions

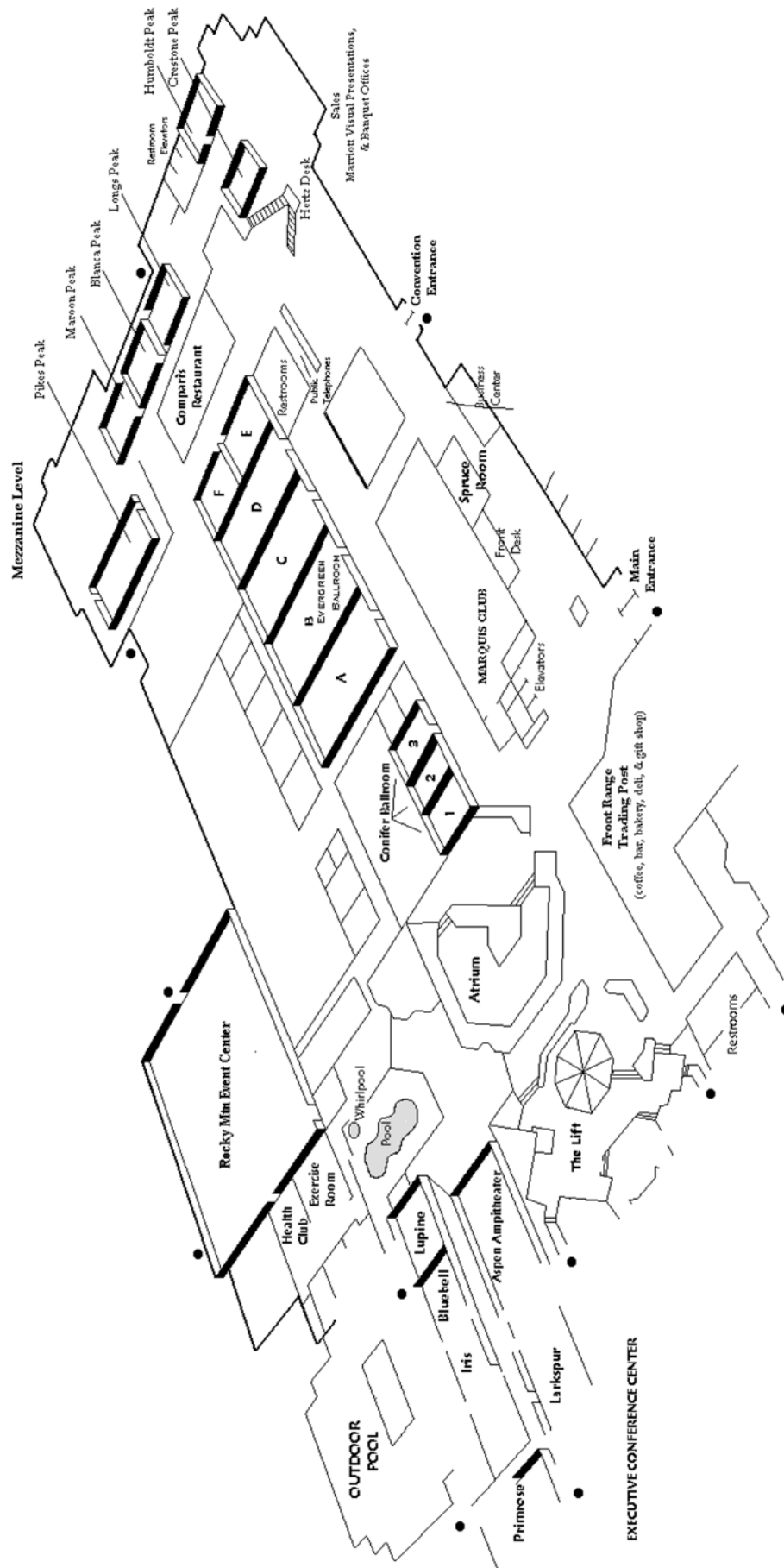
Denver Botanic Gardens, (303) 331-4000
Hudson Gardens, (303) 797-8565
The Denver Zoo, (303) 331-4100
Elitch Gardens, (303) 455-4771
Coors Field, (303) 762-5437
Mile High Stadium, (303) 649-9000
Red Rocks Outdoor Amphitheater, (303) 572-4700
Fiddler's Green Outdoor Amphitheater, (303) 220-7000

South Metro Denver Movie Theaters

AMC Theaters, Highlands Ranch 24
C-470 & Broadway, (303) 790-4262
Mann Theaters, Tamarac Square
7777 E. Hampden, (303) 755-5100
United Artists, Continental
Hampden & I-25, (303) 758-2345
United Artists, Greenwood Plaza
8141 E. Arapahoe Road, (303) 741-1200

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HOTEL LAYOUT



(Level One)

PROGRAM-AT-A-GLANCE

2010 Denver X-ray Conference Program-at-a-Glance ♦ Monday, 2 August – Friday, 6 August				
Monday Morning Workshops 9:00 am – 12:00 Noon				
	Meeting Room			
	Evergreen A	Evergreen B	Evergreen C	Evergreen D
XRD	Survey of Basic XRD Applications (Misture)		Trace Phase Identification using Chemical Information (Kaduk/Fawcett)	Texture Analysis I (Schaeben)
XRF		Standards and Advanced Sample Prep for XRF Analysis (Tsuji)		
Monday Afternoon Workshops 2:00 pm – 5:00 pm				
XRD	Two-Dimensional Detectors (Blanton/He)			Texture Analysis II (Schaeben)
XRF		Trace Analysis (Heckel)	Basic XRF (Elam)	
Monday Evening XRD Poster Session & Reception 5:30 – 7:30 pm Sponsored by Thermo Scientific & ICDD; Exhibit hall/Atrium (Kaduk/Watkins)				
Tuesday Morning Workshops 9:00 am – 12:00 Noon				
XRD & XRF	Cultural Heritage I (Walton/Eremin)			Using FEFF to Model Real-world Systems (Segre). <i>Held in rooms Evergreen E&F.</i>
XRD		Pair Distribution Function (Petkov)	Polymers I (Murthy/Landes)	
XRF				Quantitative Analysis I (Mantler)
Tuesday Afternoon Workshops 2:00 pm – 5:00 pm				
XRD & XRF	Cultural Heritage II (Walton/Eremin)			
XRD			Polymers II (Murthy/Landes)	
XRF		Specimen Preparation XRF (Anzelmo)		Quantitative Analysis II (Mantler)
Tuesday Evening XRF Poster Session & Reception 5:30 – 7:30 pm Sponsored by Chemplex; Exhibit hall/Atrium (Rosenfeld/Van Grieken)				
Wednesday Morning Plenary Session 8:15 am – 12:30 pm. The Greening of X-rays: X-rays & Renewable Energy (Toby/Snyder) Evergreen Ballroom				
Wednesday Afternoon Sessions				
XRD & XRF			New Developments in XRD & XRF Instrumentation (Fawcett)	
XRD	Polymers/SAXS (Murthy/Landes)			Hanawalt Award Session - Nanostructure Studies using the Atomic PDF (Bozin)
XRF		Fusion & Industrial Applications of XRF (Anzelmo)		
Thursday Morning Sessions				
XRD			Rietveld Analysis I (Kaduk/Misture)	
XRF		Environmental & Handheld XRF (Anzelmo/Van Grieken)		Quantitative Analysis (Elam)
Thursday Afternoon Sessions				
XRD & XRF	Cultural Heritage I (Walton/Eremin)			
XRD			Rietveld Analysis II (Kaduk/Misture)	Micro Diffraction ¼ day (Murray) Mile High Resolution ¼ day (Evans-Lutterodt)
XRF		X-ray Imaging (Havrilla)		
Thursday Evening – Off Site Event. Details to be posted on the conference web site: www.dxcicdd.com				
Friday Morning Sessions				
XRD & XRF	Cultural Heritage II (Walton/Eremin)			
XRD		Stress Analysis (Goldsmith/Watkins)		
XRF			Trace Analysis (Wobrauschek)	

2010 Denver X-ray Conference & The North American Core Shell Spectroscopy Conference Registration Form

Denver Marriott Tech Center Hotel • Denver, Colorado, U.S.A.

2–6 August July 2010

PLEASE TYPE to avoid errors on name tags and attendee list. On-line registration is also available at: www.dxcicdd.com

First Name _____ Last Name _____

Organization _____

Address _____

City _____ State _____ Zip _____

Country _____ Phone _____

E-mail _____

☐ Check this box if you DO NOT want your name included on the attendee list.

Registration Fees: Discount fees will only apply if registration form and payment are received by 1 July 2010.

Which Conference are you primarily attending? ☐ DXC ☐ NACSSC

by July 1 **after July 1**

<input type="checkbox"/> Full week: exhibits, workshops, sessions†	\$525	\$600
<input type="checkbox"/> Monday & Tuesday: exhibits, workshops†	\$475	\$550
<input type="checkbox"/> Wed., Thurs. & Friday: exhibits, sessions†	\$475	\$550
<input type="checkbox"/> Session organizer, invited speaker & workshop instructor†	\$100	\$100
<input type="checkbox"/> Student (I.D. required)	\$150	\$225
<input type="checkbox"/> Unemployed	\$150	\$225
<input type="checkbox"/> 65 and older	\$150	\$225

†Includes a copy of Volume 54 of *Advances in X-ray Analysis* on CD.

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Please take the time to answer the following questions:

1) Are you primarily interested in XRD or XRF topics?

☐ XRD ☐ XRF ☐ Equally interested in both

2) What is your highest education level?

☐ HS ☐ BS ☐ MS ☐ Ph.D

3) Job Title _____

4) Are you a new attendee? ☐ Yes

To Submit Registration Form:

Mail: ICDD, Denise Flaherty, 12 Campus Boulevard, Newtown Square, PA 19073-3273 U.S.A.

Fax: 610.325.9823

Cancellation Policy: Cancellations must be submitted in writing to Denise Flaherty. A full refund will be issued, less a \$50 processing fee, if the cancellation is received at least two weeks before the conference (Monday, 19 July 2010). No refunds will be issued for cancellations received after 19 July 2010. Please contact Denise Flaherty for any additional information, e-mail flaherty@icdd.com or phone 610.325.9814.